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FM GUIDE

CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

February 1999

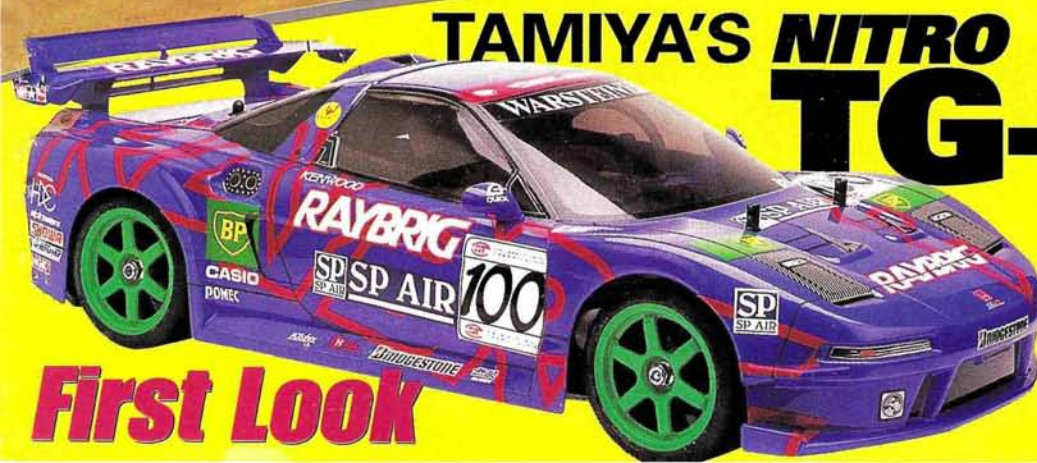
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features



96

96 Project HPI Nitro RS4

We build the "ultimates"

BY STEVE POND

110 Budget FM Radio Guide

Six systems under \$230

BY PETER VIEIRA

120 FIRST LOOK!

Tamiya TG10

BY GEORGE M. GONZALEZ

128 HOMEBUILT PROJECT

Colonial Space
Marines APC

BY PETER VIEIRA

147 Fourth Annual Readers' Choice Awards

You decide who's tops!
Vote and WIN!



128



154 Pro-Line and R/C Car Action Endless Summer Classic

BY GEORGE M. GONZALEZ

162 HOW TO TUNE the Associated RC10B3

Mark Pavidis' top-secret tuning
tips revealed

BY EUGENE "GENO" YOU

190 SECOND LOOK Schumacher Fireblade USA

BY EUGENE "GENO" YOU

thrash tests

56 Team Losi Graphite Plus NXT

NeXT big thing • BY GREG VOGEL

64 FSR Nitro Bullet

Speeding Bullet
BY CHRIS MARCY

72 CEC/Yankee 1/5 Competition Car

Livin' large • BY GREG VOGEL



80 Kyosho TF-3 Type R

Rated "R" • BY PETER VIEIRA

90 Team Associated RC12L3

The legend continues
BY EUGENE "GENO" YOU



departments

10 Starting Line

18 Readers Write

30 Readers' Rides

137 Racer News

• INNOVATOR AT WORK
— Rob Robinson of Robinson Racing Products

• SPEED SHOP

— 4x2 battery mounting for your Yokomo YR4-M2
— Fine-pitch gearing for your Street Weapon
— TAO3 lightweight driveline hardware from Tobee Craft

• RACER PROFILE

— Team Trinity driver Joel Johnson

• FROM THE WINNERS' CIRCLE

— Winning setups for the Yokomo YR4-M2 Pro and Schumacher 2000 '98

• RACER TIP OF THE MONTH

— Tamiya driver David Jun

• RACE COVERAGE

— '98 Tamiya Nats

196 Product Watch

• MIP .12 engine hop-ups
• RPM Bearing Blaster
• Take Off Set Up Board and Set Up Wheels

212 R/C Car Action Tech Center

224 Classified Ads

225 Manufacturer and advertiser contact information

263 Track Directory

columns

21 Inside Scoop

BY CHRIS CHIANELLI

34 Pit Tips

BY JIM NEWMAN

40 Troubleshooting

BY DOUG MERTES

46 Piston Power

BY CHRIS CHIANELLI

50 R/C Doctor

BY DOUG MERTES

226 Chris's Back Lot

BY CHRIS CHIANELLI

ON THE COVER (top to bottom): Hitec Lynx FM transmitter; Team Losi NXT Graphite Plus (photo by Steve Pond); Tamiya TG-10 Raybrig NSX (Hitec and Tamiya photos by Walter Sidas).

"I'm impressed!"

We hope that's what you'll find yourself saying when you crack open each issue of *Radio Control Car Action*. You want to see the fastest, wildest, most intense four-wheel machines ever to sit at the receiving end of a pistol-grip radio. Hey, we know; and that's exactly the type of stuff we strive to fill the mag with each month.



First up, Steve Pond's **Project: HPI Nitro RS4s**—easily the most mackin' nitro-powered tourers ever to explode across the pages of *Car Action*. Steve has put together not one, not two, but four machines—each wickedly fast, totally hopped-up and utterly irresistible to anyone with the slightest appreciation of high-tech R/C. You are forgiven if you skip to that article *right now*. The rest of the mag will still be here later!



Of course, our wonderfully diverse hobby offers more than just high-speed thrills. For you fans of scale detail, off-beat vehicles, military muscle and science fiction, this month's **Homebuilt: Colonial Space Marines APC** is sure to please. Robert Haverfield has lovingly crafted a precise replica of the armored personnel carrier from the sci-fi classic, "Aliens." It has a big gun on top. You'll love it.

"New" and "nitro" are two words we always like to see together, and a pair of kits featured this month fit that description quite nicely. George Gonzalez'



First Look: Tamiya TG-10 exposes the secrets of Tamiya's first 1/10 nitro touring car, while racers and enthusiasts alike are sure to appreciate the exclusive review of the hot Team Losi Graphite Plus NXT, which is arguably the most anticipated release in the off-road nitro world.

As much as we all love "the stuff," we can't forget the personalities that put a face on R/C. Turn to **Racer News** to get to know Joel Johnson, one of R/C racing's all-time greats, and Rob Robinson of Robinson Racing Products, the man who always has his *gears turning* (groan) to create innovative new products. There's all that and a bunch more, so you'd better get to it!



Peter Vieira

Peter Vieira
Editor

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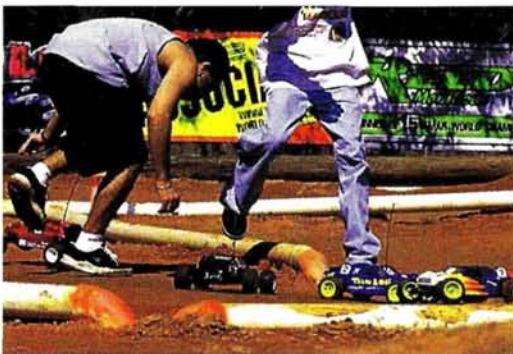
AirAGE

100 East Ridge, Ridgefield, CT 06877-4606, USA

Quit Crashin'

I have an HPI RS4 that has a few mods, such as the dual belt conversion and the Pro front end, but it's still getting beat! I'm running a Trinity D2 13-turn triple, a Novak Duster Sport II ESC and a Sanyo 2000 battery with a Futaba Magnum Sport controller. What can I do to make it more competitive? I know that my car is heavier than most of the other cars out there, but I have limited funds. Would it help to change the gear ratio, or go to a different wind of motor, or maybe just a different motor altogether? Someone told me that my motor is a little too much for my ESC. Is this true?

JERRY BOZARTH
Rainier, OR



Jerry, how is your driving? You have a ballistic motor, your updated RS4 is competitive, and you must be making run time with those 2000 cells, since you didn't note any dumping problems. I can tell you with great certainty that nothing—nothing—will slow down your lap times more than getting stuck on the boards. Conversely, not hitting the boards is the number-one performance enhancer on the planet. I've seen guys run stock motors in the mod touring class and win, simply because they never make mistakes. Practice is key. Now, about that Duster: Novak recommends motors with 12 or more turns, so you're in the clear. However, the reduced horsepower of a milder motor might actually make you faster by allowing you to stay in control.

—Chris

Which is Best?

In your opinion, which of the following cars is the best: the Losi Street Weapon, the HPI RS4 Pro, the Kyosho TF-3 Spider, or the Yokomo YR4-M2? I am interested in purchasing one of these to race at the local club. [email] ANDRE V.

Andre, the cars you mention are all fully adjustable, high-quality, competition kits that can be tailored to suit any track. As such, any one can be a winner, so I'm not comfortable with choosing a "best" for you. If all the cars you're interested in are being raced at your local track, you should speak to their owners and get their comments regarding likes and dislikes. You should also consider the availability and cost of

spare parts, and consult your gut feelings; if one car just seems to draw you in because you think it's the coolest, get it! The more you like your car, the more you'll want to tune and maintain it.

—Pete

Falcon Finder

I have a Tamiya Falcon that I want to rebuild, but I can't find parts for it. My cousin has also looked. Do you know where to find parts for it? DAVID SCHULZE
Henderson, NV

Square one for any Tamiya parts search is a phone call to (800)TAMIYA-A. If Tamiya America doesn't have what you need, try calling the mail-order places. If you don't have part numbers, ask for the technical help department, if the company has one. Of course, I am assuming that you have already called every hobby shop within two hours of your home. If all else fails, put a note on the local hobby store's bulletin board ("Falcon parts needed ...") and place a "wanted" ad in our classifieds section. Good luck!

—Greg

Making the Scene

Have any other readers asked for your help in getting an indoor track going in Denver, CO? This year, I got an RS4 and started parking-lot racing at the Westminster HobbyTown USA. I've been bitten big time by the on-road bug! Everyone who raced had great fun, and I was sad when the weather changed, effectively ending the season. Anyway, the only track in the metro area is MHOR raceway and it's off-road (nothing against off-road guys!). I thought that if enough people heard our cry for an on-road/carpet/indoor track, someone would save us from the no racin' wintertime blues! Well, thanks for listening to me whine. You guys have a great magazine. Keep the on-road (sedan and F1) stuff comin! [email] DITOME2

Dude, if you want to start a scene, then start one. Get together with all those HobbyTown USA racers and start a club. Elect a president and treasurer (make sure they're stand-up guys), then scout around for some rental space where you can lay down carpet. Each month, the club members pay dues to cover the rent (managing the cash flow is the treasurer's job). As word spreads and the club grows, the dues get lower—or better yet, the dues stay the same and you start a savings account to buy a scoring system, workbenches, more lights, pizza—whatever. Make it happen!

—Pete

Rabble-rouser

Hey guys! Tamiya changed the rules for the Tamiya Championship Series (TCS) races for this season. Tamiya motor and battery connectors are no longer required, allowing the racer to wire the car in any configuration he wishes. The use of traction compounds on the foam tires in F1 is now permitted. This allows anyone to change the overall handling of the cars. How about all the other drivers who like the racing to be as close as possible by being strictly controlled? Correct me if I'm wrong, but I thought the TCS was

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

INTERNET ADDRESSES:

Chris Chianelli: chrisc@airage.com
George Gonzalez: georgeg@airage.com
Steve Pond: stevep@airage.com
Peter Vieira: peter@airage.com
Greg Vogel: gregv@airage.com

racing with *only* Tamiya parts and equipment allowed. By all means, I'm not one of the fastest guys on the track, but I enjoy "level-playing-field" racing where everyone has a chance to be the best he can be. Now, with the changes in the rules, there are more variables to consider. I'd like to get as many opinions as I can, and I'm also writing to Tamiya. [email] ANGELO KOUTRAS

Angelo, I think the changes Tamiya has made to the TCS rules are very much in the spirit of fair competition. I don't think anyone who can afford R/C racing will have trouble affording low-loss connectors, and a short-wire ESC installation isn't rocket science. If anything, TCS racing will only be made more racer-friendly for those of us who converted our chargers and electronics to low-loss connectors years ago. Likewise, traction compound is cheap and will make racing more fun. If all the F1 cars spin out in every turn, the race will sure be equal, but it won't be any fun.

I'd be bummed if Tamiya suddenly gave the green light to dynos and comm truers and custom parts, but the little tweaks to the TCS rules are honest efforts to keep the series fun and fair.

—Pete

CLARIFICATION

The "Call for Info" section in the January issue's "New for '99" article incorrectly listed the phone number for Ace Hobby Distributors Inc. The correct number is (660) 584-7121, and Ace may also be reached by fax at (660) 584-6303. ■



BY CHRIS CHIANELLI



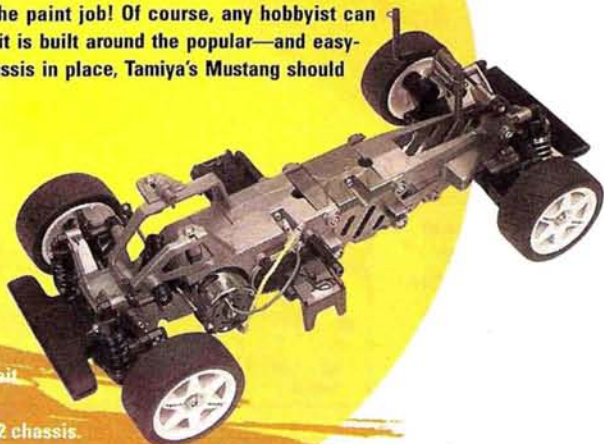
TWO FROM TAMIYA

Sometimes, it's the simple things that really catch my eye—like this simply beautiful Ford Mustang from Tamiya. Finished in classic black, this ponycar looks awesome! And even I can handle the paint job! Of course, any hobbyist can handle assembling the chassis, since the kit is built around the popular—and easy-to-build—TL01 design. With that rugged chassis in place, Tamiya's Mustang should be just as bombproof as the real thing!



Hey look, it's another Tamiya M03 ... uh, wait, that's a ... OK, what is that? It's Tamiya's newest front-wheel-drive platform, the FF02 chassis. It's based on an extended M03 but sports wider suspension arms and standard sedan-size wheels, and it wears a Peugeot 306 Maxi WRC body. Will this new front driver outperform the old TA02FF? We'll see. If looks count for anything, the car is already a winner.

Tamiya America Inc., 2 Orion, Aliso Viejo, CA 92656-4200;
(800) TAMIYA-A; fax (714) 362-2250; www.tamiya.com.



CHIANELLI-PROOF CHARGER

When I want to juice up a few packs for an afternoon of R/C, I want to do the job with as little hassle as possible. I also want to do it with just one charger, whether I'm charging receiver packs for my gas cars, 8-cell packs for my radios, or a handful of stick packs. That's why I'm stoked about the new Jet 110 from LRP; it will charge whatever you have. It can even safely juice up a single cell! Just plug in your pack, and the Jet 110V instantly adjusts its amp rate (150mA, 4 amps) for a safe charge. An LED charge indicator blinks to show charge status, and the unit automatically switches to trickle-charge operation after peak-charging. The Jet 110 also features overload and reverse-polarity protection.

LRP products are distributed by Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; fax (714) 850-1744; www.rc10.com; www.teamassociated.com.



Trinity takes a stand



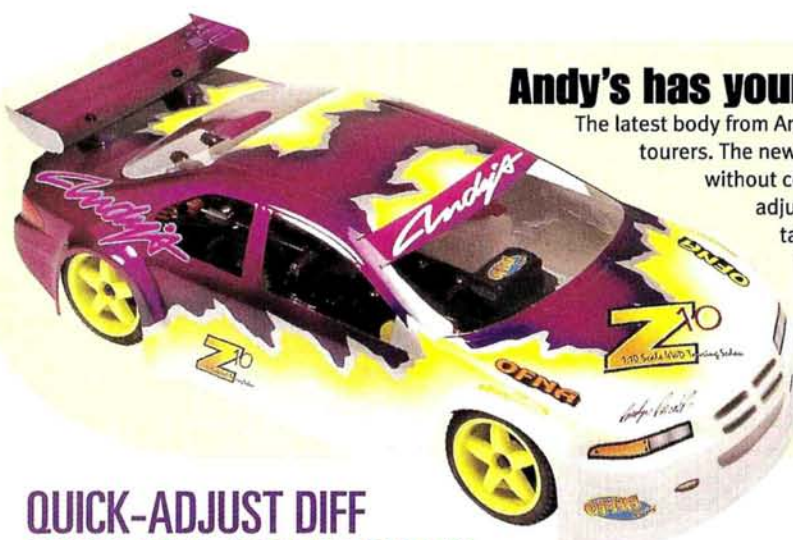
No, you are not looking at a new line of super-thick chassis! Trinity's new foam car stands are custom-cut for use with oval, 1/12-scale, touring and Street Spec cars. The firm foam gives your chassis full support but leaves plenty of room for the wheels to turn freely. The stands weigh next to nothing, and they'll never put a scratch on your car. They look pretty cool in your pit space, too.

Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; website: www.teamtrinity.com.

Andy's has your gas car covered

The latest body from Andy's, the Nitro Rocket, is specially for 200mm nitro tourers. The new shell was designed to deliver plenty of downforce without compromising front/rear balance, and a new, adjustable rear wing allows rear downforce to be custom tailored. Get yours in clear, or let Andy's paint one up for you. (I'll take mine painted, thanks.)

Andy's is distributed by Great Planes Model Distributors, 2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008.



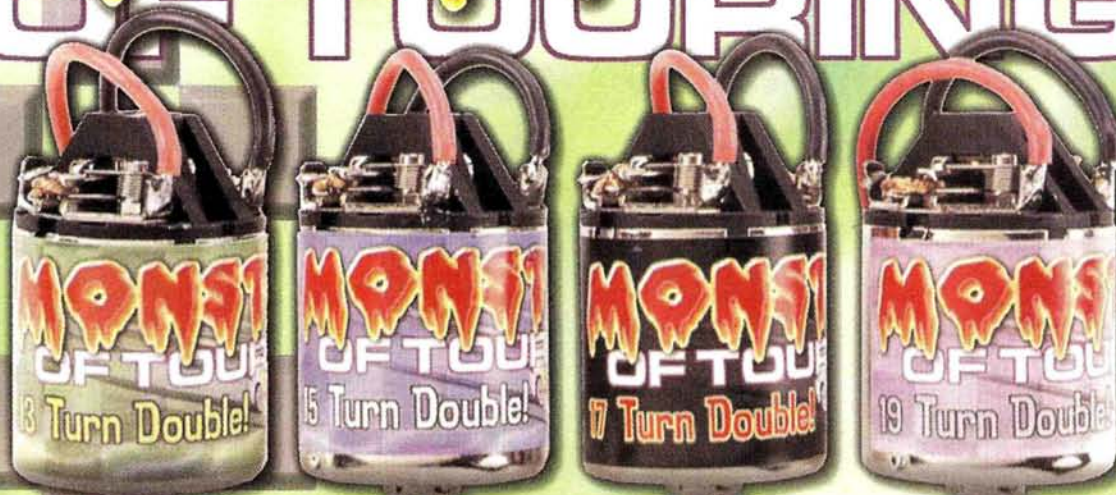
QUICK-ADJUST DIFF FROM FULL SPEED RACING

Hate tearing down your car's suspension just to dial in the diff? FSR's new system is simple—just remove the wheel from the diff screw side of the car, press the axle against the diff screw, and turn. A hex tip on the "dogbone" end of the axle engages the screw as a wrench would. Once the wheel is reinstalled, the hex cannot contact the diff screw, so "accidental" diff adjustments are impossible.

Full Speed Racing (FSR), 3941 Legacy Dr., Ste. 204, Plano, TX 75023; (972) 618-7038; fax (972) 618-7637.



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DREMEL PROFESSIONAL

Dremel's new Professional High Speed Rotary Tool is specifically for heavy, long-term use and can handle a variety of tough jobs, including tire grinding, body shaping, motor break-in, composite cutting and sanding and metal cutting—and all the other tough jobs we use it for in R/C.

Now Dremel has added a variety of enhancements to meet specific needs; for example, electronic feedback provides enhanced torque and powerful performance at low and mid speeds. The tool features a digital LCD readout that increases its efficiency, precision and accuracy



by allowing operating speed to be adjusted from 5,000 to 30,000rpm in 1,000rpm increments. Features also include a "soft-start" system that allows greater tool control as it eases up to a selected speed and ball-bearing construction for smooth, quiet operation.

The Professional accepts over 150 bits and accessories such as flex shafts, router attachments and drill-press stands to further enhance its utility, and it comes in a variety of kits with list prices of approximately \$109 to \$149. You can find Dremel tools at major hobby stores, home centers and hardware stores nationwide.

Dremel Tools, P.O. Box 1468, Racine, WI 53401-1468; ship to: 4915 21st St., Racine, WI 53406-9989; (414) 554-1390; (800) 437-3635; fax (414) 554-7654; website: www.dremel.com.

Hudy-duty tools

Distributed by Serpent, these high-tech tools from Hudy are sure to be highly coveted by racers and tool buffs alike. The lightweight aluminum handles are grooved to indicate tip size (3mm has three grooves, 2.5mm has two full-width and one half-width groove, etc.), and the tips are heat treated and precision ground. Top-shelf stuff. Serpent Inc. USA, West Park Center, 2832 NW 79th Ave., Miami, FL 33122; (305) 639-9665; fax (305) 639-9658.



this time the sequel is even better



more powerful than ever before this high performance racing pack now features Sanyo KR-1500sc cells, the only true 1500 cell in R/C racing packs. RC5920, \$22.99

the legend returns! the most popular sport battery pack ever produced for R/C racing is back and it's now packing 1400 mAHs of raw power, and a new lower price! RC5922, \$18.99



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"Better than the original, more action and a lower cost!"



Torque of the town

Schumacher's Torque Distribution System (TDS) for the company's Cat 2000 4WD off-road buggy offers the advantages of an anti-lock front braking system and includes a cleverly designed slipper clutch that controls traction to the rear wheels only while supplying full power to the front tires. "OK," you say, "I know how a slipper clutch works; tell me about this ABS thing." Fair enough. The TDS incorporates a one-way pulley for the front diff. As you know, 4WD cars with a one-way unit have no front brakes because the one-way just freewheels under braking. That's where the TDS comes in; it's basically a mini slipper clutch for the one-way pulley that allows you to adjust the drag on the one-way bearing and, thus, the front brake action. Set it properly, and you can stand on the brakes and have all four wheels grabbing without fear of the front wheels locking and taking away all your steering. The TDS unit is made of high-quality anodized alloy that's CNC-machined for precision, and PTFE slipper pad material is used to provide consistent slipping action. The TDS system will also work on the company's SST 2000, but it isn't legal for sanctioned touring-car racing.

Schumacher USA, 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; fax (813) 889-9593; website: www.racing-cars.com.

Peak serves up a new dish

Peak's new touring-car dish wheels are stylish and functional. They're very rigid, spin true and are available in natural white, black and fluorescent yellow. The rims use a standard 12mm hex to fit most touring cars, and a special offset wheel is available for the Street Weapon (complete with appropriate hex). Peak also offers similar wheels for the Yokomo MX4 off-road buggy in the same rigid material. The wheels should sell for around \$5.49 a pair.

Peak Performance, 23352-J Madero Rd., Mission Viejo, CA 92691; (949) 707-4683; fax (949) 707-4684.



MAXTEC JOINS THE SHELL GAME

As you can see, Maxtec has jumped into the touring-car Lexan-body game in a big way. Maxtec offers several models, and they all include window masks. Choose a Peugeot 406, a '98 Accord, an F50 GT1, a Volvo S40, an Alfa Romeo 156, or a CLK LM. All will fit most 190mm touring-car chassis and come with or without decals. Don't feel like painting? Order the body painted from Maxtec. Call for details.

Maxtec Development, 3609 W. MacArthur Blvd., Ste. 807, Santa Ana, CA 92704; (714) 427-5180; fax (714) 427-5190.

Bugs in the basement

This little Vee Dub is just the thing for R/C action in the basement, garage, living room, or any other small indoor space you may be squeezed into when the rain or snow starts to fall. Da Bug is the first release from BRP's Fun Wons 1/48-scale minicar line. It can be assembled with standard radio gear, and BRP claims run times of 15 minutes or more and a top speed of 20mph with 6-cell AA Ni-Cd power. A body, mounted foam tires and motor are included.

BRP Inc., 1575 Lowell St., Elyria, OH 44035; (216) 284-0270; fax (216) 284-0271.



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Father/Son Drag Duo

Ed Bohren and his son George of Cedar Rapids, IA, run these drag racers during the warmer months. Both Bolink cars have been "extensively modified" from their electric kits and have been converted to OFNA .21 nitro-powered vehicles. The dragster is equipped with an OFNA .21 P4 and single-speed tranny. The funny car features an OFNA .21 P6 and a 2-speed BMT transmission. Both have full ball bearings that replace the bushings. MIP and CVEC provide the exhaust systems, while Futaba and Airtronics radios guide them down the scale quartermile.



Burnin' Up

When he isn't racing as part of the Double "A" Racing Team he co-founded, Andy Sumner of Roxboro, NC, is probably hard at work painting a new body for his RC10T3. Here, it's topped off with a '97 Ford F150 body, which he painted with ordinary spray cans—no airbrush! When Andy races his T3, it's powered by a Trinity Sapphire 17-turn motor. The truck also features MIP gold shock shafts, a Novak Cyclone speed control and B&T matched 1700mAh and 2000mAh 6-cell packs, along with Pro-Line Eliminator rims, Edge M3 front tires and BowTie M3 rears. He says this setup brought him from dead last to TQ and a consistent second place with an occasional win. Sounds like a winning combo!

A Foursome

Fred Martinez of Brooklyn, NY, shows us his cool collection of R/C vehicles. The Tamiya TAO2 Mustang Cobra features Kose aluminum front and rear suspension arms and assorted GPM hop-ups. It's also equipped with front and rear MIP CVDs, aluminum shocks and shock towers, a full set of ball bearings, a universal prop shaft and a graphite chassis. The Mustang is powered by a Tekin Rebel, a Mighty Motor 10x2 and Sanyo 2000mAh 6-cell batteries, and it rolls on RPM Sunburst rims and HPI Super Radials. The Tamiya TAO2 '64 Low Rider has chrome wire rims, gold knockoffs and the same features as the Mustang. Also pictured is a Tamiya TGX Alfa Romeo, which Fred has left stock. Looming in the back is the Kyosho Nitro USA-1, also stock, with a .15 engine. A quick introduction to Fred's "All-Out R/C Racing Club"!



Generation Gap

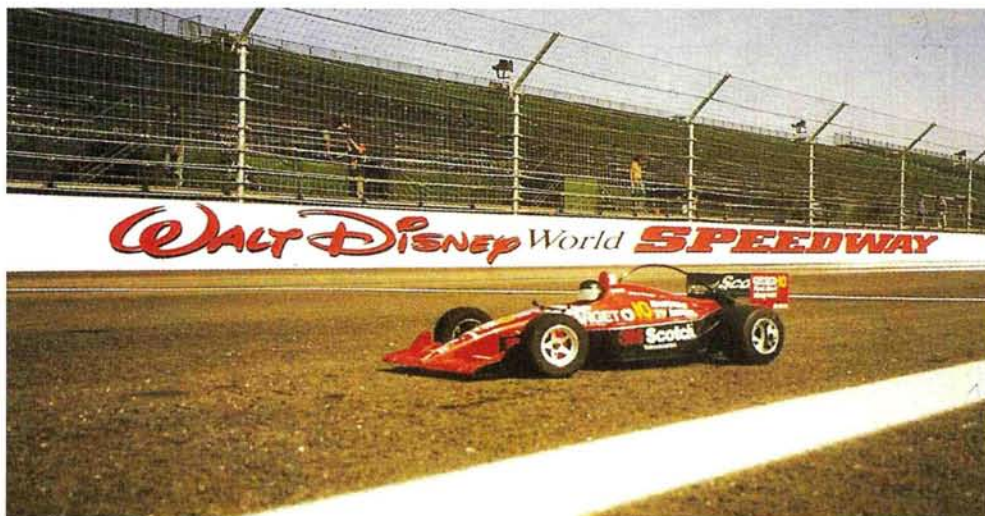
Purdue University student Brian Fisher of Fishers, IN, sent us this shot of two "very different" cars. On the right is the Associated Dual Sport Racer equipped with full bearings, a Novak Racer EX speed control, Sanyo 2000MHz batteries and a Trinity Midnight 2 motor. It's topped off

with an Andy's Camaro body. The red vehicle is an original 1923 Hiller Comet tether car that was given to Brian's great-grandfather as a bonus for buying automotive repair products. Brian says the car is mint and has never been run. Valued at \$2,000, the car "will not see any track time," he says. Wise decision!

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Mean Green Machine

Jason Popper of Hayward, CA, was inspired to build this R/C car by his "real" VW drag car. In addition to dramatically lowering the car, Jason even made his own rear slicks! The aluminum rear wing and "stinger" exhaust were also scratch-built. A Tamiya VW Bug body tops it off. The Bug is powered by a Tekin ESC and a Reedy modified 10-turn motor, and a Futaba Magnum Jr. radio steers it. Jason purposely omitted headlights and taillights because his full-scale vehicle doesn't have them. Good job, Jason!



Goin' to Disney World!

Working at the new Walt Disney World Speedway last year, Bob Noboa of Clermont, FL, took advantage of the opportunity to run his Kyosho F1 car around the track before it was opened to full-scale Indycars! Bob's open-wheeler has many Kyosho hop-ups, including full ball bearings, a ball diff, a graphite chassis and an oil-damped shock. It's rocketed by a Reedy Sonic S 12-turn double motor and a Novak Tempest ESC controlled by an Airtronics RV2P radio. This "missile" has been clocked at 54mph by the local sheriff's department. Isn't that a violation of the Indy pit lane speed limit?

Towering Truck

Gene Gandia of Rock Springs, WY, created this monster. It has a homebuilt frame of piano wire and has been painted bright yellow; the suspension arms were also handmade. The steering is controlled by a high-torque Futaba servo, and Sanyo 1700mAh batteries send power to the twin Motor Man stock motors. Gene uses the stock friction shocks but plans to upgrade soon to oil-filled units. The truck is topped off with a custom-painted Parma Bigfoot body.



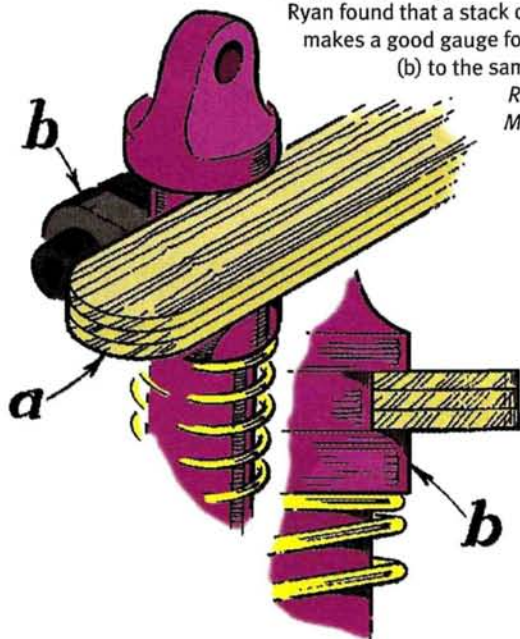
Dynamic Duo

These Tamiya TAO3 Pro and Tamiya M-class cars belong to Todd Wilcox of Utah. The TAO3 is equipped with a Hitec mini-servo, Sanyo 2000 batteries, Novak Tempest Pro ESC, Reedy Fire Hawk motor, Futaba Magnum Jr. radio, aluminum pulleys, Lunsford top shaft, Cross drive belt, aluminum shocks, narrow gear sets, custom Lexan aerodynamic chassis pan, RPM Sunburst rims, Eagle tires, lightweight kingpins and universal shafts. A Honda Accord body tops all these off. The Tamiya M car features a Honda S-MX van body and bearings, HPI tires and rims, a Novak Explorer speed control, high-speed mini-servo, a Futaba Magnum Jr. radio and Sanyo 2000 batteries. Todd has been racing for two years and started a team called "Outkast Racing" because, he says, "It fits me."

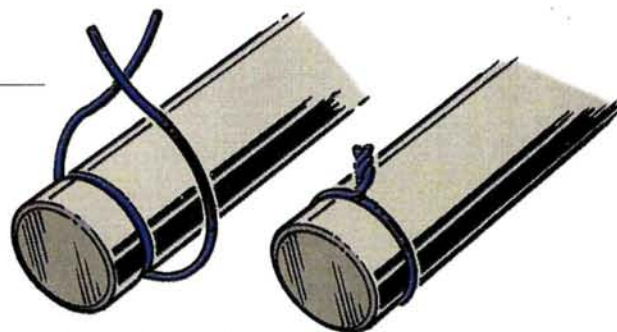
Popsicle Tip

Ryan found that a stack of Popsicle sticks (a) makes a good gauge for setting spring clamps (b) to the same height.

RYAN FREEMAN,
Mission Viejo, CA



Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



E-clipped by Wire

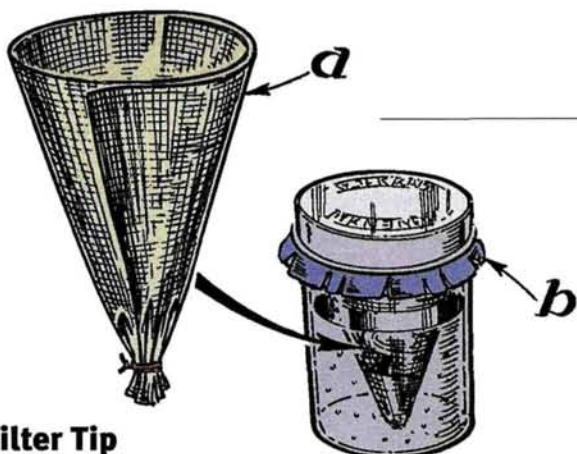
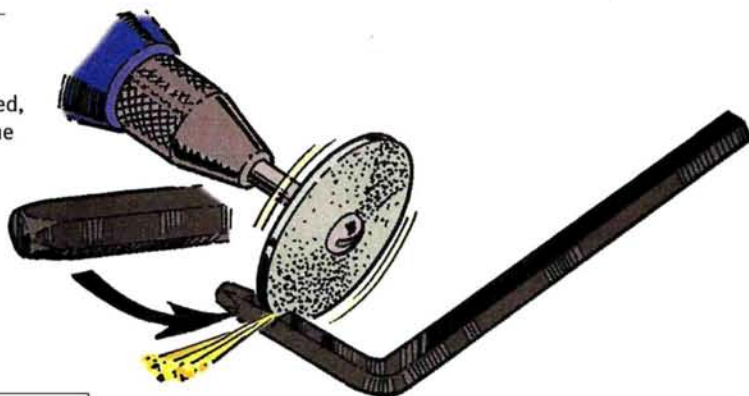
If you lose an E-clip, twist a piece of 25-gauge soft wire around the groove, and it will keep the part in place until you find a replacement E-clip.

CHRISTIAN BROWN, Ventura, CA

Squared Up

When your Allen keys become worn and rounded, use a rotary tool with cutoff wheel to remove the worn end and expose fresh, sharp edges. Be sure to wear eye protection while cutting.

NEIL TACKETT, Acme, PA



Filter Tip

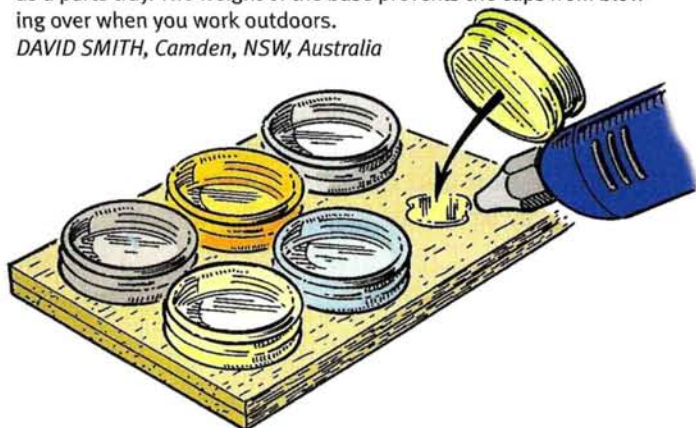
Free bearing cleaner! Roll a piece of window screen into a cone (a), secure the end with soft wire, then stuff the cone into a plastic pill bottle. Half-fill the container with plastic-safe solvent, drop in a bearing, then lay a piece of rubber balloon (b) across the top as a seal before you snap on the lid. Shake vigorously for a minute or so, remove and rinse your bearing in clean solvent then oil it immediately.

J.D. BOOTH, Eatonton, GA

Cap-tive Screws

Our Aussie buddy tells us that when rebuilding a car, it is too easy for small screws to "go walkabout," so he glues caps from milk or juice jugs, etc., to a piece of heavy Masonite or chip board to serve as a parts tray. The weight of the base prevents the caps from blowing over when you work outdoors.

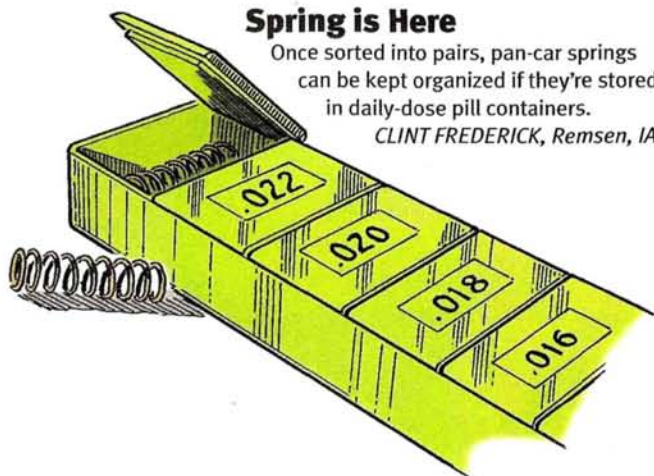
DAVID SMITH, Camden, NSW, Australia



Spring is Here

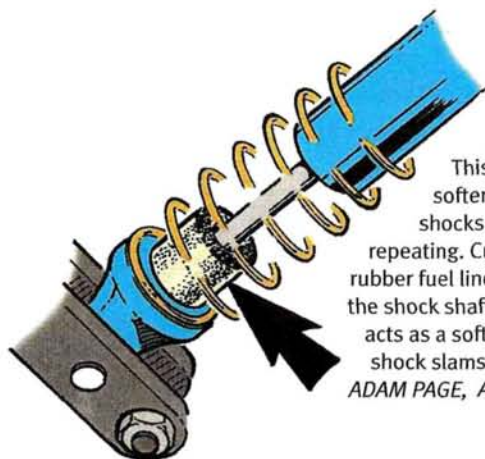
Once sorted into pairs, pan-car springs can be kept organized if they're stored in daily-dose pill containers.

CLINT FREDERICK, Remsen, IA



Anti-Slam

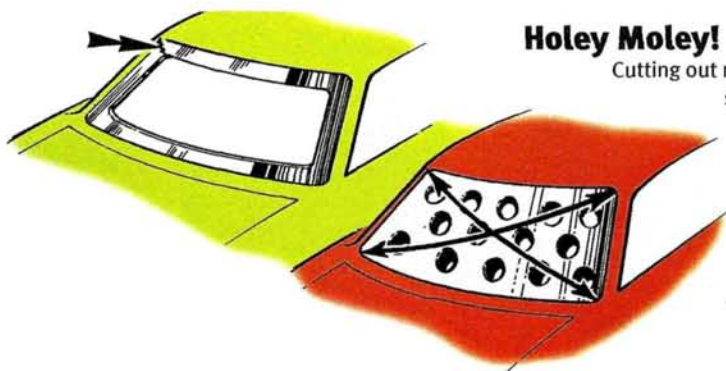
This popular method of softening the blow when shocks bottom out is worth repeating. Cut a short piece of rubber fuel line then slip it over the shock shaft, as shown here. It acts as a soft buffer when the shock slams down on landing. ADAM PAGE, Albuquerque, NM



Holey Moley!

Cutting out most of the windshield for cooling weakens the body shell and often causes cracking in the corners. Drill several large, well-spaced holes to provide adequate engine cooling without weakening the body.

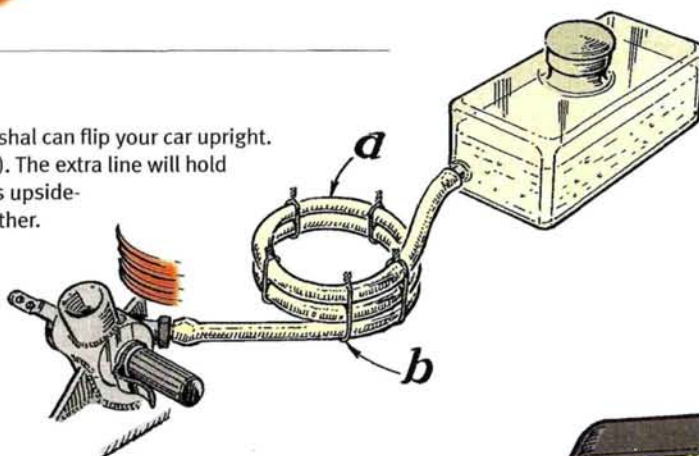
CLIFFORD LAOAN, Waipahu, HI



Do the Twist

This tip will keep your engine running until the turn marshal can flip your car upright. Make your fuel line extra long, then twist it into a coil (a). The extra line will hold enough fuel to keep the engine running even if the car is upside-down. Use zip-ties or soft wire (b) to keep the coils together.

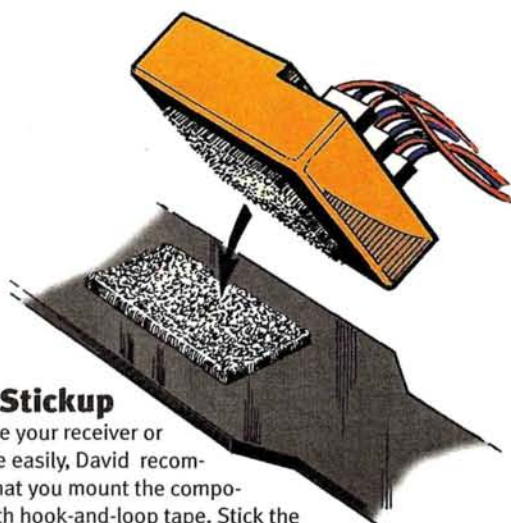
JEFF HUGHES, Portage de Sioux, MO



It's a Stickup

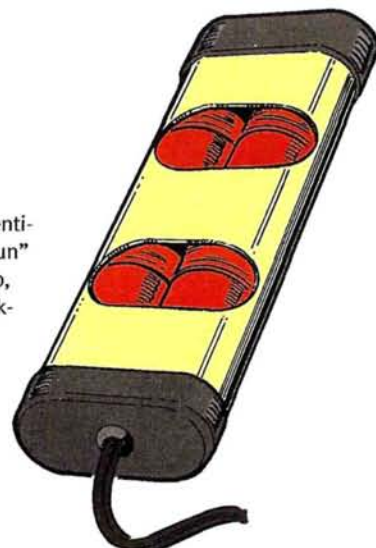
To change your receiver or ESC more easily, David recommends that you mount the components with hook-and-loop tape. Stick the hooked piece to the chassis and mount the loop side on the car. You'll then easily be able to remove components for cleaning or installation in another car.

DAVID WILINSKY, Teaneck, NJ



Shotgun Tip

For better battery cooling, ventilate your stick pack's "shotgun" tube by pulling off an endcap, removing the tube and shrink-wrap, then cutting large holes in the tube before you replace the endcap. DEREK KRUMM, Trabuco Canyon, CA





RRP

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TROUBLESHOOTING

BY DOUG MERTES • ILLUSTRATIONS BY JIM NEWMAN

Crazy Cars

I'm 15 years old and have been an R/C'er for seven years but have never raced. I own a Traxxas Hawk 2 with a Traxxas speed control and transmitter; I also have a Tamiya Lotus 107B Formula 1 car with a Spike speed control and a Futaba Attack SR radio. My problem is that when I change the crystals in the cars and the transmitters, the cars go crazy and I can't control them. What's with that? Also, I'd like to know which modified motor you would recommend for both cars.

MATT BRAUTMAN, Colorado Springs, CO



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to *Troubleshooting, Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

Matt, the Traxxas and Futaba radios are both good systems for your application. I think the problem is that you're trying to use a Futaba receiver crystal in a Traxxas receiver and vice versa. I admit I've done this at times and gotten away with it, but mixing your crystals can lead to problems. Unless you're having problems with one of the transmitters, I recommend that you stick with the controller that's intended for each car.

It's also possible that one of the radios is operating on 27MHz and the other on 75MHz; in this case, attempting to switch the crystals would certainly cause erratic radio operation (if the radio responded at all). Check the manuals that came with your radios, or carefully read the information printed on the transmitter case to make sure that you're using replacement crystals from the proper frequency band.

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Squeal for Me

I have a Traxxas Nitro Sport with the EZ Start electric starter system. When I try to start the engine, it makes a squealing sound, and after a while, only the electric starter motor turns over, not the engine. When I take the system apart, one of the drive gears (always the same one) is stripped and there are pieces of it all over the inside of the case. My dealer says this is caused by hydro lock. What is this, and what am I doing wrong?

BRADLEY SCOGIN, Peoria, IL

The first thing we need to talk about is sound. Crying babies aren't happy, the sound of breaking glass usually portends disaster, and when your car or truck starts squealing, it's a good idea to stop whatever you're doing and take a look at things. My guess is that the sound you describe is that of teeth being ground off the reduction or idler gears within the EZ Start gearbox. The next time you hear that sound, stop trying to crank over the engine because you'll destroy another gear if you continue.

It sounds as if your primary problem lies in tuning your truck's engine. Properly set up, the engine should light off as soon as you spin the starter. Hydraulic lock (an extreme version of flooding) is caused when the combustion chamber is full of fuel. Since fluid cannot be compressed, this locks up the piston in the cylinder and makes it impossible to turn over. The electric starter will attempt to crank over the engine, which won't move, so the gear teeth break. You can get rid of the lock-up by removing the glow plug and turning the engine over until the excess fuel has been expelled.

I suggest that you start by contacting Traxxas or reviewing the manual that came with your engine to determine the manufacturer's recommended baseline carb settings. Put in a new glow plug and check the head bolts to make sure that they're properly tightened. Charge or replace the glow-starter battery, empty the fuel tank, and buy yourself a new quart of fuel. While you're at it, clean or replace the air and fuel filters and invest in new fuel lines. If the engine doesn't start right up (it may run a little rich), you're probably suffering from low compression. That can only be fixed by replacing the piston and/or cylinder liner. If that's the case, look into the excellent engine-replacement program offered by Traxxas. For a set price, they'll swap your worn out engine for a fresh one. The good news is, if you do have to install a new powerplant, the glow plug, lines, filter, etc., will all work on your new engine.

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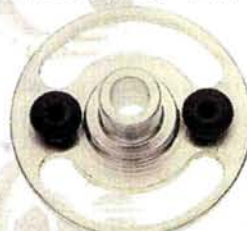
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TROUBLESHOOTING



Lacquer Attacker

I recently bought a Tamiya Supra Blitz TA02. I installed a Novak Cyclone, Tower System 3000 radio, taillights, headlights and side lights. Then I decided to paint the windows with black lacquer; that's when I found out that enamel and lacquer don't mix! The paint crinkled up and my beautiful magenta paint job was ruined. How can I remove this paint without trashing the body?

KELSEY KLEIN, St. Joseph, MO

Kelsey, you've learned a difficult lesson. Enamel is frequently used on ABS bodies because it dries more slowly and doesn't attack the paint as much as lacquer; thus, it preserves the fine detail typical of these moldings. On the other hand, most polycarbonate paints are lacquer derivatives. That's because polycarbonate is pretty tough stuff, and the lacquer actually melts a little bit of the surface when it sticks. That's why a well-painted

polycarbonate body can survive seasons of abuse and still look pretty good.

If you really want to reclaim the Blitz, try to carefully sand off the magenta color and then respray the body with high-quality paint that's made for polycarbonate. However, if you used enamel for the main color, some residue will remain no matter how diligently you try to remove it, and it will react with whatever gets sprayed on next. My advice is to reserve this body for practice and paint another one for show using polycarbonate paints from Pactra or Parma. If you always use paint from the same manufacturer on the same body to ensure compatibility and stay away from the enamel, I'm sure you'll be pleased with the results.

Slipped Diff

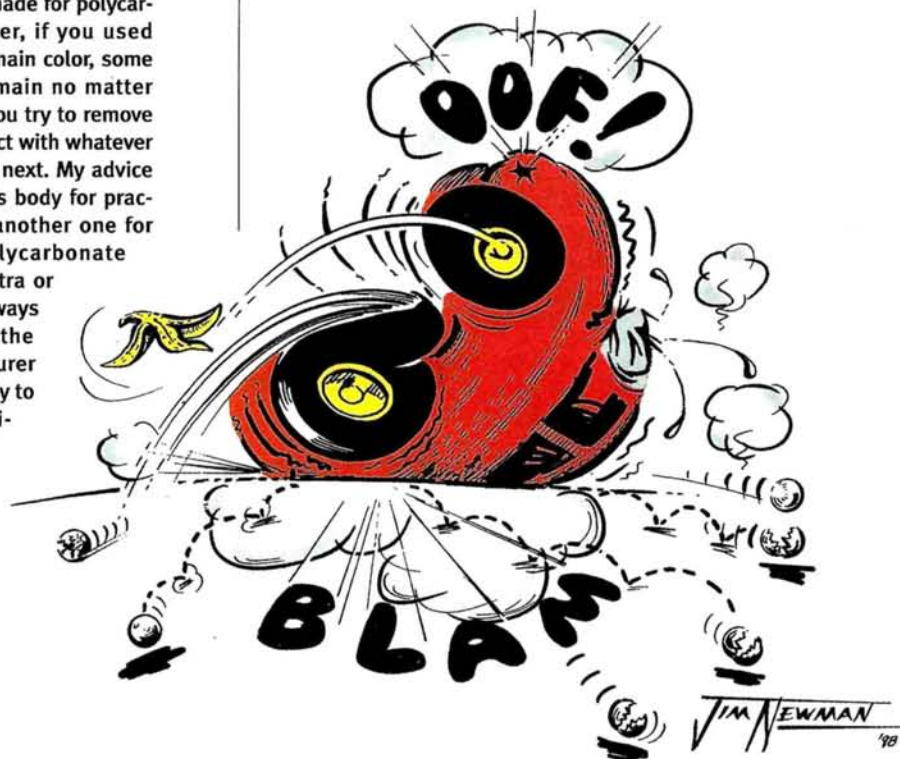
I've owned an MRC MT-10S for almost three years now, and when everything is working properly, the car just about flies! Over the past couple of years, I've invested about \$400 in upgrades, and at this point, my only trouble is with the car's differential. I can't run the car at all unless the diff is really tightened down, but when I do that, there's virtually no diff action. If I loosen it just a little to get some differential effect, the thing just slips and destroys the diff balls. Even when the diff is tightened down, it seems to loosen after about two battery packs. I run a Midnight 2 Pro with Deans plugs, a Tekin Rebel ESC and double 1500 sport packs. With the original kit's 540 motor, the problem wasn't as bad as it is now. Please help me! If you can't solve this problem, I'll have to sell the car and buy a different one.

STEVEN ILLECK, Pinckney, MI

Steven, I think it's time to get a rebuild kit to freshen up your differential. Compared to a gear differential, a ball differential can have a very positive effect on the handling of your truck; it can, however, be very temperamental when components such as the thrust bearing, diff balls and diff rings become worn.

It sounds as though your problem is the thrust bearing in the diff. The thrust bearing allows the diff to operate when tension is applied via the adjusting screw. Without the thrust bearing, there would be no diff action at all. As the condition of the thrust bearing deteriorates, the diff suffers the same fate, only at a much slower, less detectable pace.

If you haven't done any significant differential maintenance recently, then it's certainly time to at least replace the thrust bearing. If everything else in the diff is as old as the thrust bearing, your best bet is to rebuild the entire diff. It's not that expensive, and it will greatly improve your truck's handling. ■



Italians Ignite

A new racing class?

Hey Chris:

Me and my buddy were thinking about getting gas-powered R/C cars, but we're EXTREMELY new at this stuff, so don't be surprised if you get some pretty stupid questions here. Basically, we wanted to know if all gas-powered engines run on glow fuel. Is there a gasoline-powered engine? We want to know because we live in a pretty small town and have no access to big hobby stores where you can buy R/C fuel and parts. Also we would like to know if there is much of a difference between electric and gas power. Does gas have more power than elec? What are the pros and cons of each? Which has the longer duration of running time??

Anyway, I hope you can answer our questions and bring us one step closer to the R/C world.

*Sincerely,
 Adam Tiller and
 William Raymond*

P.S. We're only 14, so try to keep the technical jargon a bit simple. :)

Adam, William:

First of all, there are no stupid questions—OK? Do you think I was born running R/C cars? No, of course not. Way back when, some pretty cool guys helped me with my introduction to the R/C world. Sure, there were some jerks who wouldn't share information and would make fun of my beginner questions. I ignored the morons and stuck close to the cool guys who would help me out. It paid off. Those jerks from back then are

probably still jerks today, and I've got this totally cool job! Hah! You guys can do the same. Seek out the cool guys—avoid the jerks. They usually have bad breath anyway.

OK; now I'll try to answer your questions while keeping the technical mumbo-jumbo to a limit. You first need to understand that the terms: "gas," "glow" and "nitro" are used synonymously in our hobby when referring to alcohol-burning engines. It may be technically incorrect, but that's the way it is. Engines that really do burn gasoline are often referred to as "ignition" engines. For any information on glow versus electric, refer to Steve Pond's "Nitro Versus Electric" article in the September '98 issue of *Car Action*. Steve did an awesome job on the subject—which should come as no surprise, since Steve did, after all, learn everything he knows about everything from ME! ME!! ME!! Seriously, the piece is comprehensive and highly informative.

As for your inquiry regarding gasoline power: I am so glad you asked! One of the things so many like about 1/5- and 1/4-scale cars is the gas/ignition engines they utilize. Why? Because they run and run and run and run and keep running. Get the picture? They're super reliable! On the other hand, 1/5 and 1/4 scale are too large for the taste of many.

While at the recent Chicago Hobby Show, I ran across an Italian company called Compagnucci that makes 1/8-scale

gasoline/ignition cars powered by their MAC Series .40-size engine. Yes, the engine is available separately. I thought a first look in "Piston Power" was in order. When compared to glow fuel (alcohol), gasoline just doesn't put out as much power. That's why top fuel dragsters run methanol—a type of alcohol. To compensate for the disparity, Compagnucci doubled the displacement for their gasoline ignition engine—hence the .40ci displacement as compared to the normal .21ci for glow engines. Compression ratio is 13:1 and power rating is 1.3hp at 17,500rpm, which seems a very reasonable claim. Compagnucci also claims a 50mph top speed with their cars using this engine, and again, I have no reason to doubt this. I

saw their car run at the show, and while there wasn't a straightaway long enough for the engine to get anywhere near a full wind-out, performance looked very promising on the short track.

The engine runs on 92- to 94-octane gasoline with 6 percent lubricant for break-in and 5 percent thereafter. That means this engine will run for a half an hour on 14 cents' worth of fuel! Even the most diehard of cheap-skates can live with that. Induction is of the piston ported (or side ported) type much like that found on snowmobile engines. Ignition is handled electronically, and timing is adjusted manually. One of the more interesting features is the forced-air fan-shroud cooling—similar in principle to that found on

air-cooled Volkswagen engines. While not shown, the engine does include a dry air filter.

If pricing can be kept in line, I feel Compagnucci has started what could be another segment of racing in our awesome hobby—1/8-scale gas/ignition. What a concept!

One way or another, I will get you more performance information on this engine. Import to the U.S. is currently in negotiation so I can't tell you where to get one just yet. I would really like to see the Compagnucci line available here in America. The product is quality, and the people I met from the Italian factory were great—especially the girl with the Fellini glasses and miniskirt. OOPS; sorry about that. ■



The mini spark plug has the same 1/4-32 thread as a glow plug.

Electronic-ignition unit is powered by an on-board 4.8V battery.

Racers' radio-tuning tips

The latest generation of "super radios" has given us new tuning options. These Buzz Lightyear-style radios have every adjustable feature you could dream of; many can actually make your car handle better. I'm not suggesting that a radio can take the place of good chassis tuning and driving skills, but this new level of sophistication in control systems can minimize the effects of poor chassis setup right from the drivers' stand!

SIX TYPICAL SCENARIOS

The only caveat is that things can get pretty confusing when you start to deal with high-end digital electronic components. Just a few years ago, racers could, for example, buy an electronic speed control (ESC) and with minimal fuss, have it set up and ready to run in seconds. Then along came torque controls, more chips, variable frequency, programmable settings, download devices, etc. All of a sudden, we had sophisticated pieces of

electronics doing a lot more than just parceling out electrons. All this sophistication means that we can customize our equipment to work the way we want it to.

I asked "typical racers" to tell me about their handling problems, and they basically fell into six categories—all situations that those with high-end FM radios could have corrected or improved during a race just by making transmitter adjustments.

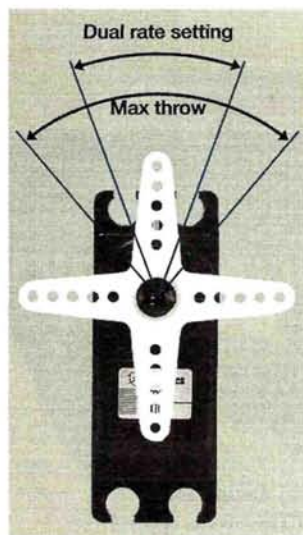
The car spins out all the time

We've all been here: you go to a new track, and no matter how carefully you work the steering and throttle, your vehicle has terminal oversteer. Everywhere on the track, the back end tries to swap places with the front end.

Even if you aren't able to eliminate your car's tendency to wiggle with time-consuming chassis adjustments, you can certainly make life better by adjusting your radio.

To reduce oversteer ("spinning out"):

Adjust the steering dual rate function for less steering throw (how much the servo moves at full left or right). With reduced dual rate, you have to move the transmitter's wheel farther to get around turns, so you can afford to be a little more extreme with steering input; just be careful not to turn steering dual rate down so much that you aren't able to get around the tighter portions of the course!



This illustration shows the maximum steering throw, which is set with the radio's EPA (end-point adjustment) function, and a reduced-travel setting made with the dual-rate function.

My car turns wide no matter how far I turn the wheel

Your car has understeer ("push"). Like oversteer, understeer can usually be traced to suspension settings. In this case, the car doesn't have enough front traction. The factors that most affect steering are caster, camber, shock settings and tire compound and pattern. If these aren't too far out of the ballpark, you can do a lot to improve steering while you're up on the stand.

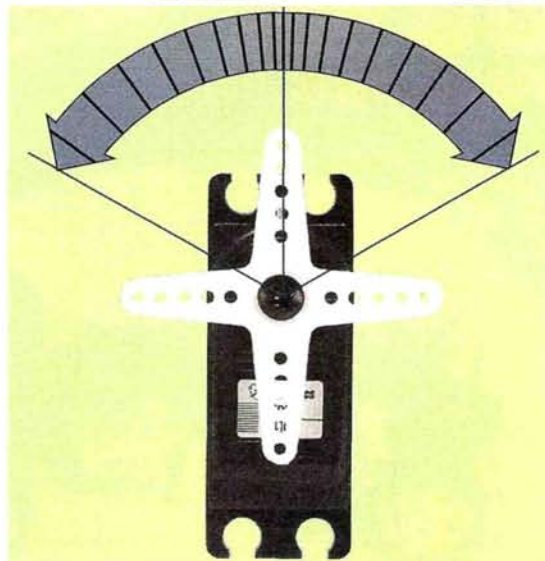
Start by checking the dual-rate and steering-throw settings. Did your thumb accidentally nudge the dual-rate dial? Is your steering using 100 percent of its available travel? If these checks don't reveal the source of your steering difficulties, the first step toward a fix is to figure out whether the problem is more severe when the car starts to go into the turn (at initiation) or when it's in the middle of or exiting the turn (duration).

If initiation is the problem:

Increase the steering exponential setting. This won't make it faster or stronger, but it will make the steering feel more



Set your steering expo for a positive value, and steering becomes more responsive around neutral, while a negative value will make the servo less responsive.



The arrows show how steering exponential works (in this case, negative steering expo is shown). The transmitter wheel is moved at a constant rate (indicated by the evenly spaced segments of the arrow above the wheel). However, the servo horn's corresponding travel is different: initially, it turns less relative to the wheel. As the transmitter wheel is turned farther, however, the horn turns at the same rate as the transmitter wheel.

responsive around neutral; as soon as you move the wheel left or right, the servo will respond with greater throw than if the exponential setting had been left at zero. You'll often find that this solves your problem entirely. If it doesn't, the next move is to increase drag braking by changing the throttle channel's neutral point. Most digital radios

have a graphic LCD or a series of LEDs that show the throttle's neutral point. Adjust the indicator so the brake is applied gently when the trigger is set at neutral. This transfers weight to the front as soon as you let off the throttle, and that increases steering response and makes it possible for you to get through the turn with a little more agility.

I can't get enough run time

I've seen the most amazing demonstrations of run time attained through proper speed-control and radio tuning. At the Tamiya National Championships, overall 4WD winner Brett Sisley used one handout Tamiya 1700mAh pack for six straight heats to power a mondo, low-turn modified motor. When I asked him whether he had problems making run time, he told me that he had actually been using older, unmatched 1400 SCR cells in practice and was easily making the 5 minutes. Brett is a big believer in throttle control; rather than hammering the throttle all the time and then having to crank on the brakes to make it

through turns, he uses only as much trigger as is necessary to get him through each section.

If you can't manage to control your throttle finger as well as this national champion does, adjust your radio to help yourself out. If you increase the throttle travel of your second channel, for instance, you'll have to yank it all the way back to the grip before you hit top speed; the remaining throw will be plenty to get you around the track like Mr. Speedy.

If that doesn't do the trick, consider negative throttle exponential. This causes the servo to be less responsive to inputs around the neutral portion of the throttle, and it

slows response off the line and out of turns; these are two places where you'll burn a lot of amps, and a softer response will make it easier to control the car. Of course, when it comes to run time, there is no substitute for proper gear ratios, but the aforementioned radio tips do help.



Throttle exponential can make a car feel more punchy (positive expo) or may be used to help smooth power delivery for better acceleration on slippery tracks (negative expo).

Poor acceleration

Let's say your motor just doesn't have as much snap as it used to. You can still make your car or truck pop off the line and out of the turns by increasing the throttle exponential setting. Effectively, this makes your throttle channel more sensitive to inputs, and it makes the ESC respond with quarter or half throttle (depending on your setting) when you just start to move the trigger. Long a favorite of drag racers who want all of the throttle to come in *right now*, this is also a great trick for road racers who want to compensate for a weak motor. My local Formula 1 club uses a 35-turn spec motor, and I've used additional throttle expo for years to make my F1 car leap off the starting line and into the lead. This is another case in which proper gearing is critical for maximum performance, but a little help from your radio goes a long way when the race has already started and you've miscalculated!

This thing is too sensitive

Have you ever seen a car or truck wandering around the track's infield and bouncing off the inside and then the outside of the track barriers? Although this is sometimes identified as terminal oversteer, most racers whose equipment falls victim to this frustrating malady never really go fast enough to find out that their car won't steer the way they want it to. They will be pleased to know that the proper steering exponential setting will calm down their car substantially. Negative steering expo reduces the servo's responsiveness around neutral so that it reacts less quickly to the inputs of a nervous driver who's trying to deal with the effects of a heady adrenaline rush.



A little negative expo can help settle twitchy handling.

Inspired to do some George-Jetson style tuning? Go for it!

Under braking, it just spins!

Do you have problems with your 4WD sedan or off-road buggy spinning out under braking, especially while entering a turn? Some of today's modern radios offer an anti-lock, or ABS, braking option by which the radio sends a pulsing signal to the braking circuit in the ESC. These pulses minimize lock-up but allow maximum braking power. ABC can be specially helpful to you 4WD guys with one-way systems, which do not provide 4-wheel braking.

Depending on the model of radio you own, the pulse strength, frequency and other factors

may be regulated, allowing the driver total braking control on virtually any surface. This has such a profound effect on the handling of some cars that it has been outlawed by several racing organizations. When the ABS on Futaba and KO radios is activated, for instance, the power light blinks. This permits officials at certain gas and electric events to make a quick inspection on the drivers' stand before the race takes off and to ensure that nobody is using ABS illegally. Before you commit to a chassis setup using ABS, check with your local race director to make sure that

the rules allow it.

Inspired to do some George-Jetson style tuning? Go for it! The new breed of digital radios allows you to easily experiment without fear of screwing up a good setup. If your changes don't improve the car, then it's click-click-click, and you're right back where you started. With so many features so conveniently adjustable, there's really no excuse for not trying them all. Isn't that why you bought that big-dollar radio in the first place?

**Addresses are listed alphabetically in the Index of Manufacturers on page 225. ■*



The KO Mars' anti-lock brake function (shown here) is highly tunable. ABS: WIDT (width) adjusts how much brake is applied with each brake pulse; ABS: CYCL (cycle) adjusts the speed of the pulses; ABS: DUTY adjusts the length of time the brake stays "on" during each pulse; ABS: POS (position) adjusts how much conventional braking is allowed before ABS switches on.



Team Losi **Graphite Plus NXT**

by Greg Vogel

It's impossible to think about innovative R/C race trucks without thinking of Team Losi*. After all, the JR-XT was the first bona fide electric race truck in an era of converted buggies, and the "XT" line has always been rife with new off-road technology. Likewise, Team Losi's first foray into nitro trucking, the GTX, with its preset gear mesh and unique plate chassis, was an interesting departure from the norm. For 1999, Losi has revisited the truck and made a spate of improvements to take its handling, durability and versatility to new levels. Rechristened the "NXT," Team Losi's next-generation nitro truck looks as if it has the right stuff, but does it? I bet this weekend's entry fees that the answer is "Yes."

SPECIFICATIONS

SCALE 1/10
LIST PRICE \$499.95

DIMENSIONS (chassis only)

Length overall 15.25 in. (387mm)
Wheelbase 11.25 in. (286mm)
Width (F/R) 12.5/12.75 in.
(318/324mm)

WEIGHT

Gross, RTR 62.9 oz. (1,783g)

CHASSIS

Type Plate w/molded upper deck/box
Material Aluminum/graphite composite

DRIVE TRAIN

Type Sealed gearbox
Primary Clutch bell/spur
Transmission MIP CVDs
Differential Ball
Bearings/bushings Bearings
Slipper clutch Dual disk

SUSPENSION (F/R)

Type Independent A-arm w/upper camber link
Damping Oil-filled, coil-over shocks

WHEELS

Front/rear One-piece plastic

TIRES

Front/rear Silver ribbed/Silver Reptile tire

EXHAUST

Header Aluminum non-pull-start
Pipe Aluminum tuned pipe

POWERPLANT (not included)

Engine O.S.* CV w/DuraTrax heat-sink head
Carb Barrel
Displacement .12



NeXT BIG THING



REFINED REAR SUSPENSION

The NXT's rear suspension arms are the same as those on the GTX, but the suspension-arm pivot supports are cantilevered off the sides of the chassis to provide a wider hinge-pin spread. This gives the NXT a broader stance and helps counteract chassis roll—always a consideration, given the top-heavy nature of nitro engines. New hub carriers provide 1 degree of toe-in per side to help cornering without hindering straightaway speed. A new rear shock tower optimizes the suspension system with updated shock and camber link positions.

ALUMINUM/GRAPHITE CHASSIS

This is a familiar platform—a sturdy slab of black-anodized aluminum with stamped-in front kick-up. All the screw holes are countersunk to prevent the screw heads from being mangled when the chassis bottoms out. The rear of the chassis extends past the transmission to form a shelf for the receiver battery, which is protected by the curved sides of the shelf and held tightly against a foam pad by zip-ties. The graphite upper plate/fuel tank enclosure is molded in one piece and extends from the front bulkhead to the front of the engine. In addition to providing a home for the fuel tank, the piece stiffens the chassis considerably. Rubber grommets isolate the fuel tank from vibration. A new aluminum brace joins the transmission and top plate and increases the NXT's engine options; the old GTX brace limited engine selection, but the new piece will accommodate most of today's popular powerplants.

3-GEAR TRANSMISSION

A full set of smooth ball bearings grace the NXT's drive train. As you'd expect, there's a 3-gear tranny and a bottom-mounted ball diff. The diff is easy to maintain and easy to adjust from outside the truck. Like Losi's latest electric vehicles, the NXT features a dual-disk slipper clutch. Losi has adapted the dual slipper to all of its top cars because it maintains consistent slip throughout a race. A large drum brake gets the squeeze from a padded graphite lever that's actuated by redesigned linkages. MIP CVDs complete the NXT's driveline. They provide smooth action and reduced backlash for efficient power transmission to the wheels.

INCLUDED ENGINE ACCESSORIES

The G-Plus NXT comes with an aluminum manifold, which is for non-pull-start engines and is similar to the manifold on Associated's RC10GT. Aluminum manifolds are much quieter, and the exhaust resonates more efficiently. Although the pipe looks like a ringer for the GTX's, a closer look reveals it's a little longer. The engine is bolted to a non-adjustable engine mount, so gear mesh is preset. To change the clutch-bell/spur-gear ratio, you'll need to buy clutch bells and spur gears in sets. You might think this system is less convenient to use, but the opposite is true. There are no gear-mesh hassles, and the engine won't budge, no matter how crazy the action gets.

TITANIUM UPGRADES

You'll be pleased to find that the Graphite Plus NXT includes a full set of graphite parts, titanium turnbuckles and Team Losi's own coated titanium shock shafts. The turnbuckles are much lighter than steel and nearly impossible to break, and the shock shafts smooth damping action, extend the time between rebuilds and give a consistent feel. In addition to the graphite and titanium candy, you'll also find ball-bearing steering, aluminum wheel nuts, aluminum axle spacers and Losi's new Reptile rear tires as part of the G-Plus package.

FRONT SUSPENSION

Subtle, but important, refinements were made to the NXT's front end. A new fiberglass shock tower with revised geometry is bolted to the block-style bulkhead. The suspension arms are the same as the GTX's, but they're molded in graphite, since this is the full-option NXT. The steering knuckles and carriers are also GTX carryovers, but new longer axles accommodate the XX-T wheels.

YOU'LL NEED

- 2-channel radio system.
- High-torque steering servo.
- Standard servo for throttle/brake (high torque preferred).
- Receiver battery.
- Charger for battery.
- Non-pull-start .12 engine.
- Starter box or bump starter.
- Fuel for glow-powered engines.
- Glow-plug heater.
- Servo-saver.
- Paint for polycarbonate body.
- CA glue.

BUILDING & SETUP TIPS

I was lucky enough to snag one of Losi's prebuilt models for this review, so my tips are few. My experience with Losi kits, the NXT's excellent manual and the tear-down work I've done on the truck, tell me that most of you will find assembling the NXT a simple, by-the-numbers affair. On my local track, I found the standard setup

excellent—with the right tires, of course—and it should be a good starting point for most other venues.

■ When putting the truck together, use thread-lock on all screws that go into metal; if you don't, vibration will definitely loosen them.

■ Gear mesh is preset, but if you aren't careful when installing the engine, you can move it just enough to cause binding. Take an extra 30 seconds to get it right.

■ Give the slipper and diff a couple of laps to break in, then tighten them again. They need to seat themselves to work properly.

■ Scuffing the clutch shoes and cleaning the clutch bell will help the clutch engage with more authority (this is a good tip for any gas vehicle).

PERFORMANCE

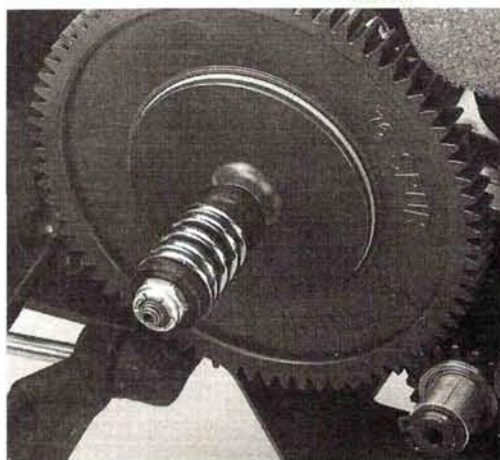
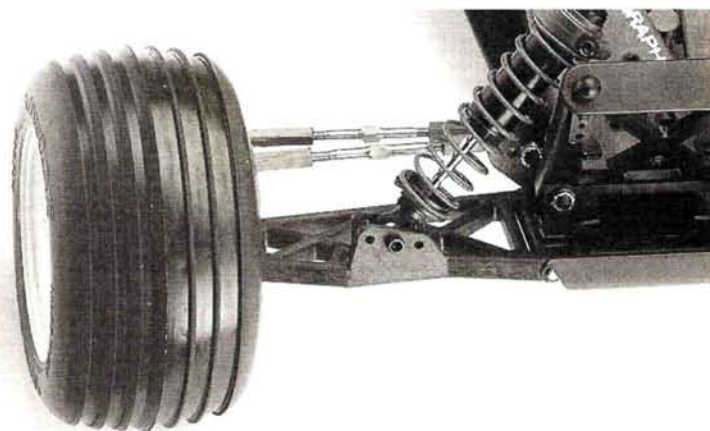
Senior editor Steve Pond and I packed up our race equipment and headed to Xtreme Radio Control Hobby's freshly groomed off-road track to test the NXT. The track has a tight, technical layout with a good-size washboard section, a long straight and a challenging tabletop that plunks the cars into an off-camber 180-degree turn.

The biggest challenge, however, proved to be the surface—loamy on top and hard packed underneath. The NXT's Reptile treads weren't the hot setup for this unusual surface, so I bummed a set of worn-out Losi step-pins, and they hooked up well, even though they were worn. The rest of my setup was stock—straight from the owners' manual. I have to say that the crew over at Team Losi really did their homework to provide a great all-around stock setup; I was dialed out of the box.

I quickly discovered that the NXT has mounds of steering, as I was able to hug the corners closely without scrubbing speed. Like every other Losi vehicle I've owned, the NXT attacks the jumps and bumps and destroys them. It was sure-footed over the long washboard section and skated through ruts without getting out of shape. The tabletop-into-hairpin section demanded a nose-first landing with immediate steering input—a combination that tends to dump many vehicles onto their lids. The NXT however, proved to be quite forgiving and did the maneuver easily, even when my approach wasn't spot on.

During a heat race, I had quite a scare when I flipped the truck over. The turn marshal who ran out to recover the truck

Up front, the Graphite Plus NXT features graphite suspension arms, titanium tie rods and coated shock shafts.



Below: new rear pivot blocks move the graphite suspension arms out to give the NXT a wider stance. MIP CVDs, aluminum axle spacers, titanium tie rods and shock shafts are all included with the Graphite Plus kit.

The double-disk slipper debuted on the XX-4 and has since been adapted to all of Team Losi's top-shelf racing kits. The dual disk provides consistent slip throughout from start to finish.

squashed the rubber stinger on the exhaust pipe. I heard the muffled engine begin to choke and prepared for a sprint to the starter box, but the marshal let go just before the engine quit. The rubber stinger won't bend or kink like an aluminum one may, but it can pinch off the exhaust system if it's handled carelessly.

Steve and I swapped trucks so he'd be able to get the feel of the new NXT. He, too, commented on its surefootedness through the rough sections and its ability to recover from erratic landings. With only a few minutes behind the wheel, Steve was putting down laps just as fast as mine. Based on this, I expect racers of all experience levels to feel at home driving the NXT.

- Graphite, titanium and MIP CVD hop-ups are included.

- Excellent instruction manual.
- Handles great with minimum tuning.
- Easy to maintain.



- Just nitpicking: the rubber exhaust stinger can pinch off the exhaust system if it's handled carelessly.



THE COMPETITION

	Losi Graphite Plus NXT	Team Associate RC10GT Team Kit	Traxxas Nitro Rustler
Wheelbase	11.25 in. (286mm)	11.1 in. (282mm)	11.83 in. (289mm)
Width (F/R)	12.5/12.75 in. (318/324mm)	12.25 in. (311mm)	12.5/12.4 in. (318/315mm)
Weight	62.9 oz. (1,783g)	64 oz. (1,814g)	63.7 oz. (1,806g)
Diff type	Ball	Ball	Planetary gear
Brakes	Drum	Disk	Disk
Exhaust	Aluminum tuned pipe	Tuned pipe	Composite tuned pipe
List price	\$499.95	\$445	\$475
Available at*	NA	\$237.99	\$279.99
Reviewed in	2/99	5/94	6/97

*Prices vary with location.

FINAL THOUGHTS

The NXT is the type of vehicle you can set down on almost any track and be competitive without major tuning; this is convenient for experienced racers and a real boon to newbies who have their hands full just learning engine basics. Rest assured, NXT chassis setup is a no-brainer; of course, there's ample tuning capability if you feel the need, but if you're in front, why bother?

The NXT is available in three versions to suit your needs and budget: NXT, Racer NXT and Graphite Plus NXT (tested here). Team Losi's factory support should improve parts availability dramatically (I'll spare you the boring details of the distribution system prevalent in the GTX days), and it's a fair bet that you'll see many NXTs in the gas-truck class in the months ahead.

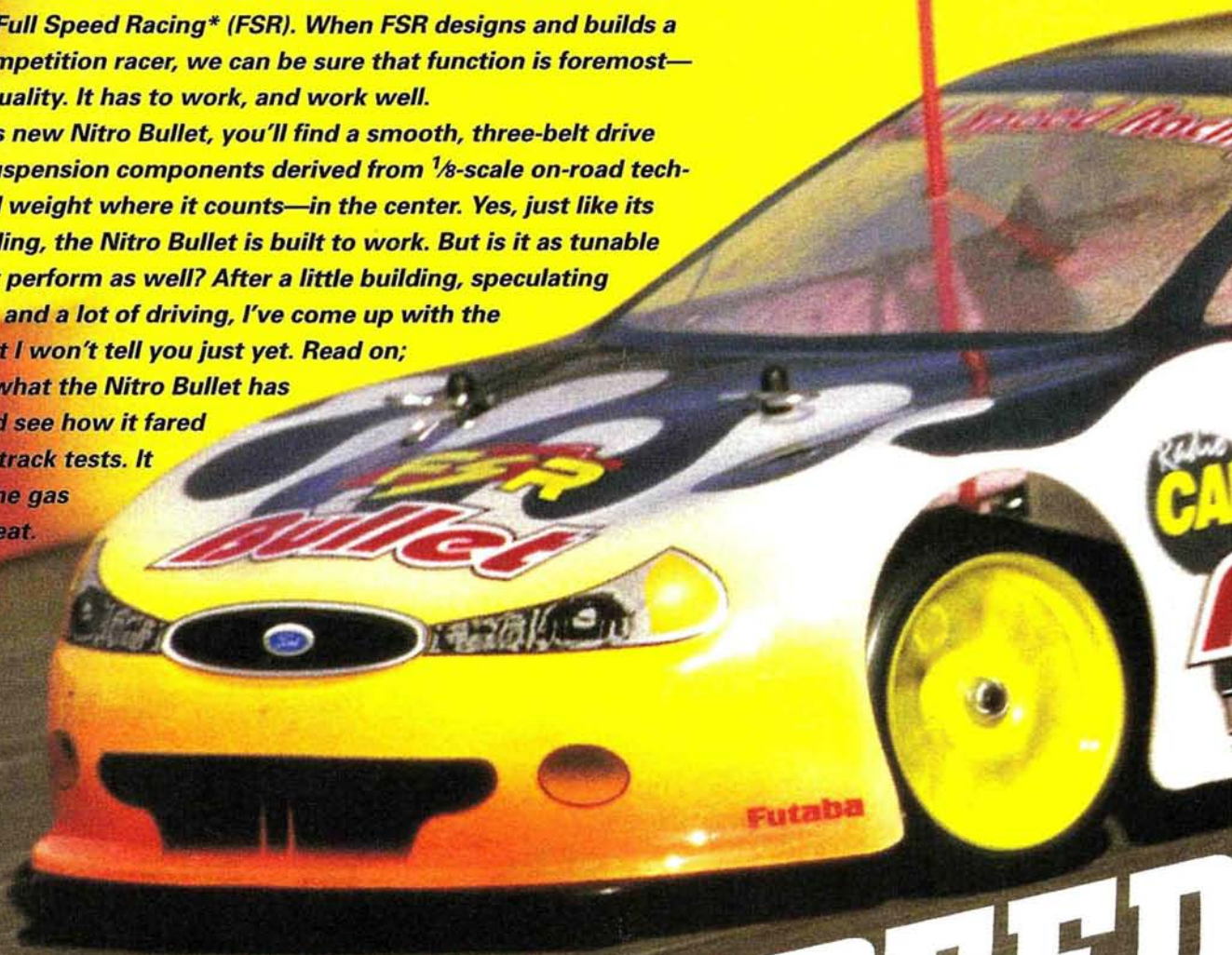
*Addresses are listed alphabetically in the Index of Manufacturers on page 225.

FSR Nitro Bullet

by Chris Marcy

Functional. That's the word that comes to mind when I think of Full Speed Racing* (FSR). When FSR designs and builds a competition racer, we can be sure that function is foremost—that, and quality. It has to work, and work well.

ON FSR's new Nitro Bullet, you'll find a smooth, three-belt drive system, suspension components derived from 1/8-scale on-road technology and weight where it counts—in the center. Yes, just like its electric sibling, the Nitro Bullet is built to work. But is it as tunable and does it perform as well? After a little building, speculating and tuning and a lot of driving, I've come up with the answer, but I won't tell you just yet. Read on; check out what the Nitro Bullet has to offer and see how it fared during my track tests. It might be the gas sedan to beat.



SPEED



FLYING BULLET

s p e c s

SCALE 1/10
LIST PRICE \$499.99

DIMENSIONS

Length of chassis 12.5 in. (318mm)
Wheelbase 10.25 in. (260mm)
Width (F/R) 7.5 in. (190mm)

WEIGHT

Gross, RTR 52 oz. (1,474g)

CHASSIS

Type Plate
Material Aluminum

DRIVE TRAIN

Type Belt-driven 4WD
Primary Clutch bell/spur
Transmission Universal drive shafts
Differential(s) Ball
Bearings/bushings Bearings

SUSPENSION

Type (F/R) Double wishbone
Damping Oil-filled coil-over

WHEELS (F/R)

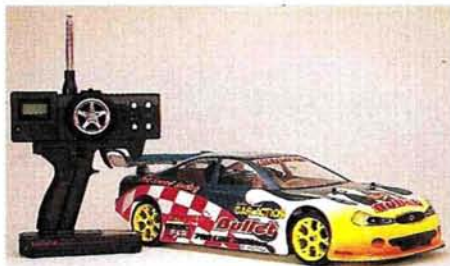
Type One-piece molded plastic
Dimensions (DxW) 2x1 in.

TIRES (F/R)

Type Standard-width slicks
w/foam inserts

POWERPLANT

Engine FSR
Carb Barrel
Exhaust Composite tuned pipe



FRONT SUSPENSION

The Nitro Bullet is 100 percent tunable—adjustable caster, track, rear toe and front and rear camber. The nylon front A-arms offer three shock-mounting locations. FSR uses a ball-link suspension like that of an on-road 1/8 car, with a large ball stud attached directly to the steering knuckle. This design reduces the number of moving parts, allows you to alter the car's width and lets you reduce steering-knuckle play. Plastic coil-over shocks damp the front and have a very smooth feel. Shims between the front upper arms and mount allow caster adjustments. My experience with the electric Bullet has shown the front upper A-arm mount to be a weak point. An optional aluminum A-arm mount (part no. FO-25) is available.

DIFFERENTIALS AND DRIVE TRAIN

The Nitro Bullet comes with smooth, front and rear ball differentials supported by ball bearings (like the rest of the drive system). Adjusting the diffs takes a little work: you have to remove the inside inner hinge pin on the top arm to get to the diff-adjustment screw. When you get this right, however, you're set. FSR's optional dogbones (part no. FO-63) make this adjustment a breeze by incorporating a hex-head into the dogbone end; the diff is adjusted by removing the wheel and pressing the axle into the outdrive. The Nitro Bullet has three drive belts: the front and rear belts are in the center of the chassis, and the third belt runs along its right side. An aluminum standoff with a roller raises the center belt above the clutch bell, and a ball bearing above the front center belt pulley prevents a belt flip.

Power is transferred to the wheels via front and rear universals. When you need to stop, two stainless-steel plates and a disk-brake pad give all the stopping power you need.

FACTORY OPTIONS

- Universal dogbones**—part no. FO-63.
- Aluminum
 - servo mounts—FO-17.
 - gearboxes (F/R)—FO-27/FO-39.
 - front upper arm—FO-25.

**With Allen-head bolt to allow diff adjustment without disassembly.

ALUMINUM CHASSIS

The Nitro Bullet chassis layout is similar to that of the electric version, but it's of 2.5mm-thick aluminum with radiused edges. The chassis seemed overly flexible, but once all the components had been mounted, this was almost eliminated. The holes in the chassis are countersunk to take 4-40 flat-head screws—a nice feature that protects the screw heads and prevents them from being snagged on the ground. The electric version has a graphite upper plate that stiffens the chassis. This wasn't feasible on the gas version because of the positions of the gas tank and engine. Most gas cars are 200mm wide; the Nitro Bullet is 190mm, and I like this because it allows a wider choice of bodies.

REAR SUSPENSION

The rear A-arm mounts are of a ball-and-socket design that allows adjustable rear toe and takes play out of the rear. Coil-over, plastic-body, oil-filled shocks damp the rear. At first, I was disappointed not to find FSR's metal-body shocks (the electric car has them), but during the performance tests, the Nitro's shocks worked very well.

ENGINE

Out of the box, the Nitro Bullet is equipped with an FSR V-12, which produces plenty of nitro-burning horsepower. The engine has a quick-change clutch bell that allows you to easily change the pinion gear if you want to make gear-ratio changes. An optional 2-speed transmission is also available if you really want to fly. An aluminum manifold coupler and a composite tuned pipe handle the exhaust.

FUEL TANK AND BATTERY

The 75cc fuel tank has a flip-top lid and primer to get gas into the engine. The tank and the receiver battery are in the center of the chassis for effective weight distribution.

TIRES AND WHEELS

The Nitro Bullet comes with Pro-Line regular-width slick tires, foam inserts and bright yellow Pro-Line Warlock rims—good all-around tires for racing and play.

DIRECT SERVO STEERING

Steering comes from a supplied servo-saver—a direct system that minimizes steering play. It's easy to mount the servo with FSR's universal servo-mounting bracket, but installing it in the car takes a little finesse. The links run from the hubs to the servo-saver with no bellcranks. The servo's output spline is in the center of the car for equal steering left and right.

YOU'LL NEED

- 2-channel radio w/1 servo and an ESC.
- Battery pack.
- Charger.
- Paint.
- Tools for assembly.
- CA glue for tires.

- Highly adjustable
- Centralized weight (gas tank, engine, servo, battery).
- No bellcrank steering.
- Ball-link suspension reduces play.

👍 Likes

- Once the car has been assembled, the diffs are hard to adjust without optional dogbones.
- Chassis is a bit flexible.
- Plastic shocks, but they work well.
- Weak upper-A-arm mount.

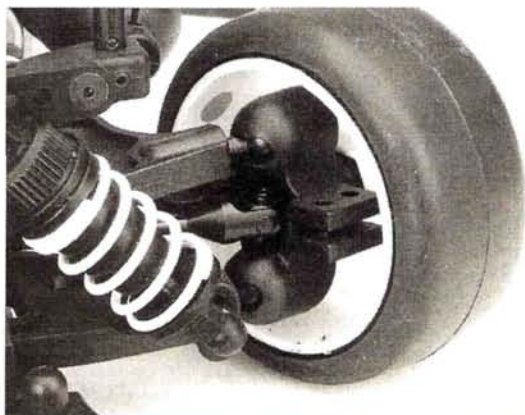
👎 Dislikes

PERFORMANCE

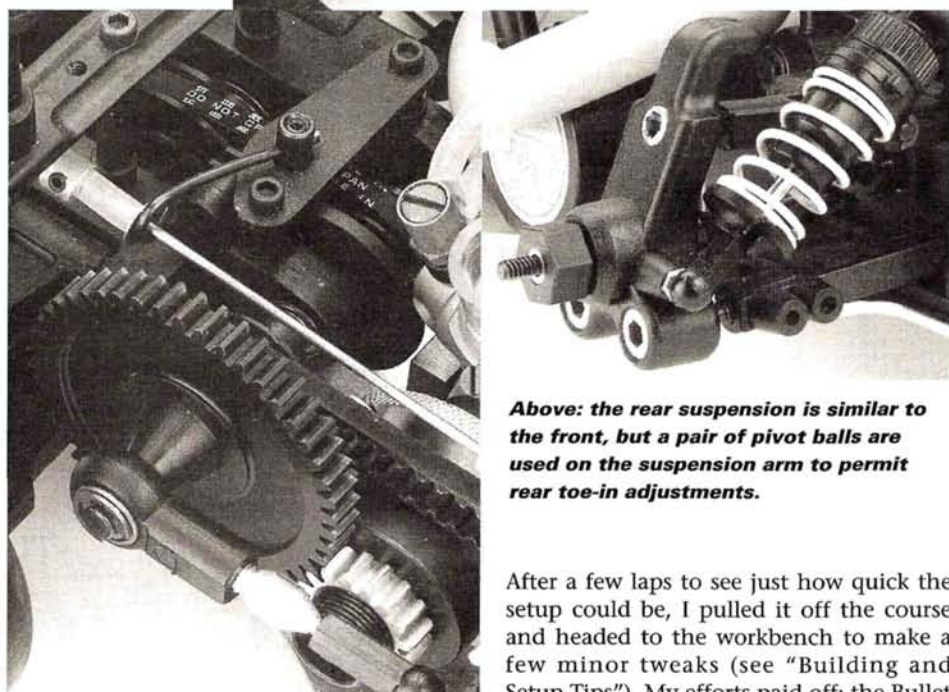
The long-awaited time had come: I headed to the asphalt roadcourse. With just three pulls on the pull-start, I had the V-12 running—not bad for a new engine. I broke the engine in, set the car on the pavement (without the body) and gave it a couple of quick squirts of the throttle—and watched as the front universal was ejected from the car! I found this unusual, since the universals in my electric Bullet have held up well. I yanked a universal from the aforementioned car to fix the Nitro Bullet, and headed back to the track. Again, the reli-

able engine fired within a few pulls and I was off and running.

After a few hot laps to scuff the tires and warm up the engine, I leaned it out and let it rip. The Nitro Bullet's acceleration was pretty impressive, but as I entered the corner, I experienced a slight push. This made the car very forgiving, but I knew it was eroding my lap times.



Left: large pivot balls support the steering knuckles. Camber adjustment is made by threading the balls into or out of the arms.



Above: the rear suspension is similar to the front, but a pair of pivot balls are used on the suspension arm to permit rear toe-in adjustments.

Above: a large-diameter turnbuckle supports the layshaft, and a threaded clutch bell permits pinion changes without pulling the engine.

After a few laps to see just how quick the setup could be, I pulled it off the course and headed to the workbench to make a few minor tweaks (see "Building and Setup Tips"). My efforts paid off: the Bullet hooked up through the corners and sure-footedly exited the turns—definitely a faster ride. This is by far the best running gas car I have driven, and with only a few slight tweaks from its box-stock form, it was hooked—impressive.

The ejected universal was my only

BUILDING & SETUP TIPS

- Take the usual precautions: read the instruction manual and use thread-locking compound on any machine screws that thread into metal. After the first run, check the diffs and the chassis for loose parts.
- I ran the car with the 1-hole piston drilled to no. 56, 70WT oil and white springs up front. In the rear, I ran the 2-hole piston drilled to no. 56, 40WT oil, and white springs.
- I used 16-tooth pulleys on the long belt.
- Glue the diff rings on the diff hubs; slipping diff rings can cause erratic diff action in the turns.
- Pro-Line's green (front) and yellow (rear) capped tires work best at my home track.
- I used one caster shim in front of the upper arm and two in the rear.

problem, and it was easy to replace. The tires played a major role in getting the car to stick. I chose Pro-Line's mounted slicks because I knew they worked well on my track. To get the Bullet hooked up on your home track, start with tire swaps, then tune the suspension.

FINAL THOUGHTS

I'm sure that you are just as excited about the Nitro Bullet as I was when I received the kit. If you're a little disappointed by the plastic shocks and fiberglass parts, don't be. Yes, metal and graphite parts would be nice to have, but at a club event, not having them won't put you in the B-main instead of the A-main.

The car's superior tunability is all you need to get it dialed in, but this tunability is also why I don't recommend this kit for beginners; they might find it frustrating to have to adjust the components, and may easily tune themselves into a no-fun setup.

FSR definitely has a nitro-powered success on its hands. If you're serious about competition, I recommend you take advantage of the FSR Nitro Bullet.

**Addresses are listed alphabetically in the Index of Manufacturers on page 225.*

THE COMPETITION

	OFNA Nitro Z-10 Pro/Semi-Pro	HPI Nitro RS4 Racer	HPI Nitro RS4	FSR Nitro Bullet V-12	Mugen Prime 12
Wheelbase	10.28 in. (261mm)	10.25 in. (260mm)	10.25 in. (260mm)	10.25 in. (260mm)	10.25 in. (260mm)
Width (F/R)	7.32/7.20 in. (206/204mm)	7.2/7.85 in. (183/199mm)	7.2/7.85 in. (183/199mm)	7.5 in. (191mm)	7.5 in. (191mm)
Weight	49.4/49.1 oz. (1,400/1,392g)	51 oz. (1,446g)	50 oz. (1,418g)	52 oz. (1,474g)	58.5 oz. (1,658g)
Diff type	Ball	Bevel gear	Bevel gear	Ball	Bevel gear
Brakes	Graphite/composite	Fiber	Composite	Graphite	Composite
Exhaust	Muffler	Muffler	Muffler	Tuned pipe	Muffler
List price	\$499.95/\$359.95	\$329	\$329	\$499.99	\$355.99
Available at	\$325.99/\$237.99	\$217	\$205	\$319.99	\$219.99
Reviewed in	8/98	8/98	6/97	02/99	7/98



CEC/Yankee by Greg Vogel **1/5 Competition Car**

Bang for the buck. That's what's on everybody's mind, whether we're shopping for a stereo, a television, a bike, or an R/C car.

And if you're looking for a really big bang, you might as well go for big-scale. That's where Custom Electric Cars (CEC) jumps in with the Yankee—a 1/5-scale gas-burning on-road racer that will definitely meet the needs of those who want big-car performance without a big cash outlay.*

Let's jump in and check out what makes the Yankee stocker a good choice for those of us who are into the big stuff.

SPECIFICATIONS

SCALE 1/5
LIST PRICE \$4,350 (w/Turn Force steering system, throttle/brake servo and RX Ni-Cd installed)

DIMENSIONS (chassis only)
Length overall 33 in. (838mm)
Wheelbase 20.5 in. (521mm)
Width (F/R) 14.5 in. (368mm)
 14.25 in. (362mm)

WEIGHT
Gross, RTR 22.1 lb. (627g)

CHASSIS
Type Plate
Material Aluminum

DRIVE TRAIN
Type Chain
Primary Clutch bell/spur
Differential(s) Gear
Bearings/bushings Bearings

SUSPENSION (F/R)
Type Double wishbone
Damping Oil-filled, coil-over mono-shock/oil-filled coil-over shocks

WHEELS
Front/rear One-piece spoked

TIRES
Front/rear Rubber slick

ENGINE
Engine Yankee 22cc
Carb Barrel
Muffler/pipe Tuned pipe



LIVIN' LARGE





FULLY ADJUSTABLE REAR SUSPENSION

The independent rear suspension relies on pivot balls instead of hinge pins. The rear hubs have three pivot balls; the largest one is on the bottom of the hub and may be screwed into or out of the suspension arm to alter camber. The other two pivot balls are on the top of the hub and act as attachment points for the fixed upper wishbone and adjustable toe link, which can be shortened or lengthened to adjust toe-in. The independent rear suspension uses bellcrank-style linkage to activate the lay-down shocks. A large swaybar connected to these bellcranks helps to reduce chassis roll.

MONOSHOCK FRONT SUSPENSION

The single, large-capacity shock is actuated by the front-suspension arms by means of a one-piece rocker. The rocker works like a swaybar: lift the left front wheel and the right front will also rise. Unlike a swaybar, however, the rocker doesn't flex, so there's little, if any, independent suspension action. It will be interesting to see how this affects handling. The suspension arms have ball-stud pivots instead of hinge pins, and there aren't any hub carriers: the steering arms simply pivot on oversize ball studs that may be screwed into or out of the arms to adjust camber.

ENGINE AND PIPE

Yankee's 2-stroke mill features a heavy-duty recoil starter. A huge carburetor with choke takes care of the throttle and fuel is filtered by a large sponge filter. At first glance, it looks as if CEC has plugged a flashlight into the manifold, but that's actually the tuned pipe. A large fuel tank feeds the engine and provides run times of up to 45 minutes.

CHAIN DRIVE

A quick peek at the drive system tells you that this car means business. The huge steel planetary gear differential is encircled by the sprocket for the drive chain. At the other end of the chain is another small sprocket that's mated to a layshaft with a composite spur gear. An extension from the spur supports the fiberglass brake disk, and a clutch bell with a composite pinion transfers the power from the 2-stroke weed-whacker-type engine. The axle joints are protected from harmful debris by rubber boots and, of course, the entire drive train is supported by smooth ball bearings.

ALUMINUM CHASSIS

The chassis is pretty simple: it's a large slab of high-quality aluminum. A large, high-density-foam bumper and aluminum nerf bars offer protection from impact.

BODY AND TIRES

Yankee offers a variety of body styles; CEC supplied stock-car and touring-car bodies for our review. The hard-compound tires are pretty sturdy; they flex very little and should wear well, but I'll reserve judgment until I've done some testing.

YOU'LL NEED

My car arrived assembled with the radio installed—the best way to go, in my opinion. To complete the car, I needed:

- Paint for the body.
- Regular unleaded gasoline.
- One-gallon fuel can.
- 2-stroke engine oil.
- Eight AA batteries for the transmitter.
- Charger for the receiver pack.

INCLUDED ELECTRONICS

Here, the center of attention is the massive Turn Force steering servo that uses a 380 motor to move the rack-and-pinion steering mechanism. The unit's built-in tie rods are sealed by rubber boots. If you opt for the full car package, it comes with a Futaba FM radio system installed. The downside to this system is the standard 3003 servo used for the brake. We recommend that you pick up a high-torque servo for stronger braking and save the 3003 unit for a 1/10 vehicle. A 5-cell receiver pack handles the power draw from the massive steering servo and the rest of the onboard electrics.

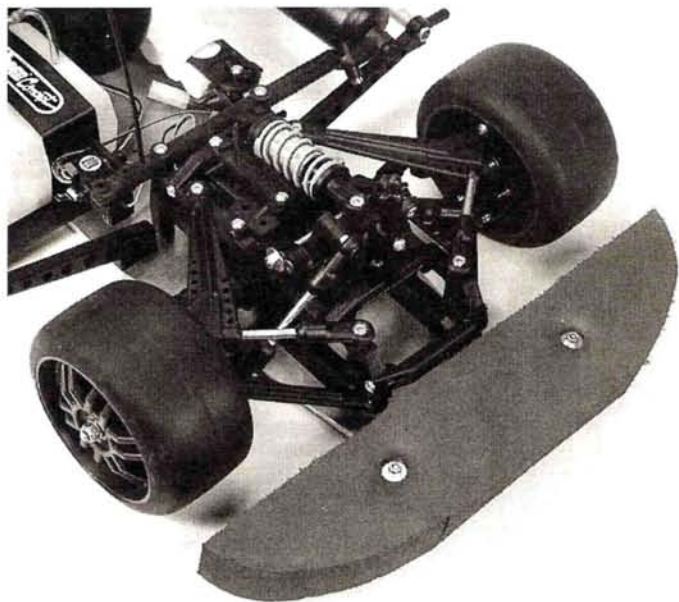
PERFORMANCE

Firing up one of these gas-burning monsters is always an event. The other R/C Car Action editors and a few spectators gathered in the large parking lot outside our offices to watch me give the stocker its break-in run.

I used the choke to prime the engine, and it fired up easily. I let it warm up and

then took off. The car was as fast as other 1/4- and 1/5-scale cars I have driven, and it had the same primary handling trait—wide turns at speed. When running this machine, be sure to have a large, wide open space.

Then I moved to a nearby banked parking lot with several small islands; there were no parked cars, so I threw



The front suspension is very solid. A large monoshock provides the damping. The Turnforce steering unit is hidden beneath the shock. This massive "servo" can turn the wheels even when the car is at a standstill—pretty impressive.

- A big car is always fun.
- Pre-assembled.
- Powerful engine.
- Many body styles to choose from.

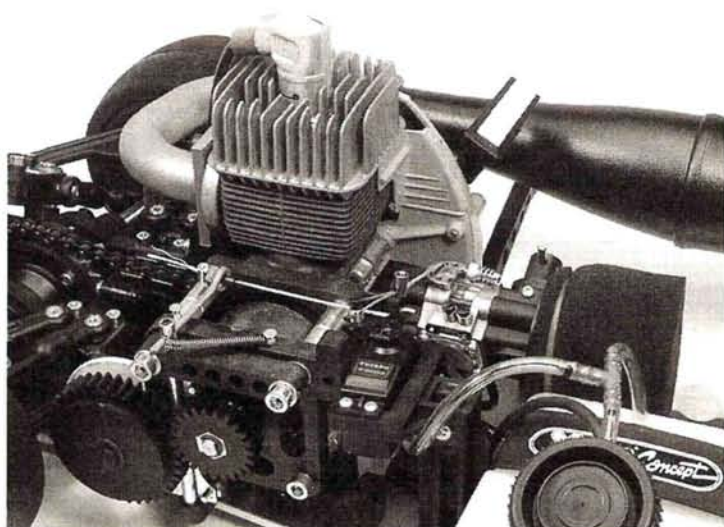


likes

- Wimpy throttle servo.
- Shock-preload spacers weren't included with our car.

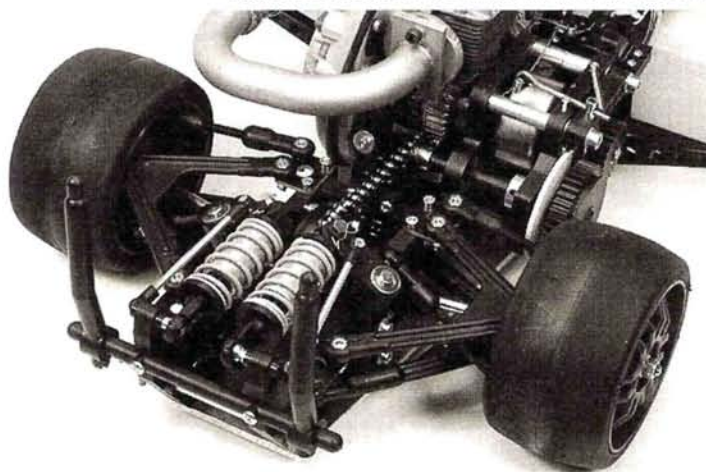


dislikes



Yankee's big 22cc gas-burning engine may seem a little intimidating, but when you fire it up and hear the rumble of the exhaust,

you'll be smiling. You can adjust the gear ratio to suit your racing needs. Left: the stout rear suspension is damped by a pair of shocks that are activated by bell-crank arms. Here, you can also see the heavy-duty chain that drives the car and the wide rubber tires that put down the power.



down some corner dots and made a track. The car handled very well, and the tires coped pretty well with the unprepared surface; this impressed me. Slick tires don't usually do too well on a dusty surface, but the Yankee's hard rubber kept

the car on course.

The car's acceleration was amazing—definitely got my heart pumping. The most impressive aspect of a true gas-powered car is, however, run time—approximately 45 minutes. That's a lot of

play time from one tank, and with a quick fill-up, the fun seems nonstop.

FINAL THOUGHTS

For fun, these machines definitely score an 11 out of 10. The Yankee's user-friendliness is perhaps even more important than its great handling and durability. A few yanks on the pull-starter cord, and the engine roars to life and you're throttling down the lot or track; it doesn't get easier or better than that. The car's weight and the pitch-and-slide driving it encourages can, however, be tough on tires.

I'm sure the Yankee would do well in competition, and though no large-scale car is ever what you'd call *cheap*, this big Yank certainly delivers a lot of bang for the buck.

**Addresses are listed alphabetically in the Index of Manufacturers on page 225.*

BUILDING & SETUP TIPS

I have a slight problem here; the car comes assembled, so I don't have any real building suggestions—just a few helpful hints.

- Check the car frequently for loose screws; these big machines vibrate a lot, and vibration loosens fasteners.
- Our test car's ride height was a little low, and it didn't come with any preload spacers that could raise it. Zip-ties made acceptable stand-ins, but the fix looked hack.
- The Yankee runs on regular gasoline, but you must mix it with pre-mix oil before you fill the tank. CEC recommends 3.2 ounces of oil to 1 gallon of gas, and this ratio is easy to obtain: just buy a 1-gallon gas can and dump in a 3.2-ounce bottle of oil. Simple.
- Always charge the receiver pack before play. These big monsters aren't fun to chase down if the receiver pack dies.
- Finally, a warning: if you don't have an R/C track to run on, you'll need a large, empty parking lot for the Yankee. If there are any onlookers, warn them to stay clear of the car (trust me, you'll get 'em). Though it's cool to have an appreciative audience, people often get dangerously close, and this is a *big* car.

Kyosho by Peter Vieira **TF-3 Type R**



R It's a letter that's used a lot in the world of high-performance (and would-be high performance), full-size vehicles. Sometimes, an "R" tacked onto a car's name indicates a full host of go-fast options; other times, an "R" just gets you stripes and cup holders. So, now that Kyosho* is wielding "R" power with the TF-3 Type R touring

chassis kit, the burning question is this: are we getting real performance upgrades here? A quick glance suggests this car has it all, if the mirror finish of the woven-graphite chassis and the gleaming aluminum shocks are any indication. However, we will not be content to measure the car on its skin-deep beauty. Let's see whether the TF-3 can earn its "R" rating.

RATED

R



s p e c s

SCALE 1/10
LIST PRICE \$399.99

DIMENSIONS
Wheelbase 10.1 in. (257mm)
Width (F/R) 7.5 in. (190mm)

WEIGHT
Gross, RTR 47.3 oz. (1,341g)

CHASSIS
Type Double-deck plate
Material Graphite

DRIVE TRAIN
Type Dual belt
Primary Pinion/spur gear
Transmission (F/R) Universal/dogbones
Differential(s) Ball
Slipper clutch None
Bearings/bushings Bearings

SUSPENSION (F/R)
Type Lower A-arm w/turnbuckle
camber link
Damping Aluminum-body,
oil-filled shocks

WHEELS/TIRES (not included)
Type (F/R) TRC touring-car foams
(pink/green)

ELECTRICS (not included)
Motor Trinity D3 14x3
Battery Trinity VIS-2000
ESC Tekin G12c III



PERFORMANCE

R/C Madness in Enfield, CT—unofficial home track of *Radio Control Car Action*—was the test site of choice for the TF-3 Type R. With a fresh Ozite carpet track in place for the indoor season and a lot of rabid touring-car racers ready to bang doors, Madness would be a good test of the Type R's competitiveness.

I had no idea what the hot setup would be for carpet—aside from low and stiff—so I installed O-ring spacers in the shock bodies, filled the dampers with heavier oil and mounted TRC* green tires all around with a splash of Trinity* Zip Grip for extra stick. From the first squeeze of the trigger, the Type R was way loose; I drove it that way for half a pack just to see whether I'd be able to adapt to the car, but I couldn't keep it pointed in the right direction even with throttle-curve and torque-limiter tweaks. Back in the pits, I swapped the green front tires for harder pinks and left them unsauced. The car then felt much more planted, with just a little on-power understeer.

YOU'LL NEED

- Body.
- 6-cell battery (saddle or stick pack).
- Electronic speed control.
- Steering servo.
- Wheels and tires.
- Transmitter and receiver.

FACTORY OPTIONS

- 2-speed transmission—part no. SPW-9.
- Urethane mini bumper—SPW-16.
- Low-friction belts (F/R)—SPW-17/SPW-18.
- Swaybar set—SPW-19.
- Graphite main chassis (unslotted, for use w/stick packs)—SPW-23.
- Carbon shock stays, low mount (F/R)—SPW-24/SPW-25.
- Universal swing shaft (for "wide" setup)—W5066.
- Quick-release body mounts—39502.

DURALUMIN MOTOR PLATE

The Type R includes Kyosho's optional "special center mount"—a beefy, 6mm-thick motor plate. The piece is machined from duralumin, an alloy that is harder and stronger than aluminum, and it features countersunk motor-screw slots that allow O-rings to capture the screws so they won't fall out when the motor is removed; it's a small thing, but it does make life easier at the bench.

ONE-WAY PULLEY

The Type R incorporates a one-way pulley into the layshaft assembly. A fixed pulley is also included with the kit for those instances in which a front one-way is not beneficial. The rest of the

Type R's drive train spins on shielded bearings; the steering bellcranks are the only moving parts that are bushed.

WIDE/NARROW SUSPENSION ARMS

The front and rear suspension arms each feature two sets of holes for the hubs' hinge pins; these permit the chassis to be assembled "wide" (200mm) or "narrow" (190mm) without trimming or replacing suspension parts. However, you will need to fit longer dogbones and upper camber links to complete the conversion. Ironically, these pieces are included with the fiberglass TF-3 kit but not with the Type R. Turnbuckle camber links are used all around.

SLOTTED GRAPHITE CHASSIS

Unlike the stick-packs-only design of the standard TF-3 chassis, the Type R accepts saddle packs. An included adapter allows stick packs to be fitted as well, using Kyosho's quick-release battery tray. The chassis' graphite components are of very high quality and precisely cut. Note the transponder mount that sprouts off the upper plate; if that doesn't say "Race me," nothing does.

FRONT UNIVERSAL DRIVE SHAFTS

Plated universals help smooth power delivery to the front wheels, while the rear axles are conventional dogbones. Friction-fit drive hexes are used to join the wheels to the axles, instead of the more familiar cross-pin-type design.

ALUMINUM TOURING SHOCKS

Kyosho's Teflon-coated dampers are top-shelf pieces, but the kit includes only a single piston with each shock, and this limits adjustability. Preload spacers of various thicknesses are included, however, and various shock-oil combinations can be used to alter damping. Kyosho supplies rather than "green" oil with the kit, but heavier oil is recommended for all but the bumpiest tracks. Note the "standup" shock position afforded by the graphite shock towers; it differs from the deeply angled shock position of the standard TF-3.

BALL DIFFERENTIALS

Although their multi-piece outdrives and pressure plates are unusual, the Type R's ball diffs proved smooth and reliable. The thrust bearings are nearly microscopic, however, so don't wait too long for a rebuild if the diff action gets rough; the tiny balls won't take much abuse. I found carpet dust particularly insidious; the Type R's diffs needed a rebuild after a day of racing.

TEST GEAR

- TRC foam tires • Trinity VIS-Extra matched cells • KO* Mars transmitter and KR-297FZ receiver
- Trinity D3 14x3 motor • Robinson* 86T spur and 22T pinion gear • Protoform Alfa Romeo body

- Built-in transponder mount.
- Rugged construction.
- Smooth drive train.
- Excellent shocks.



Likes

- Only one set of shock pistons is provided.



dislikes

- No front belt tensioner.
- Friction-fit drive hexes are a hassle.

I drove like a spode for the first qualifier, but my best laps were competitive with the fast guys. Everyone there was impressed with the Type R's speed down the long back straight, and they were surprised to learn that the D3 providing the ponies was "only" a 14x3. Josh Littleton, one of Madness's fastest regulars, took the car for a spin and announced that he wished his car handled as well—high praise, indeed. As the night wore on, I made no changes to the Type R and wound up winning the B-main; not bad. During a night of high-power, high-traction racing, however, the Type R did develop a lot of slack in the front belt, which crackled loudly as it slipped when powering out of turns.

I returned to Madness on Sunday for another go-round, but this time, I bolted in the kit's stick-pack adapter, since my saddle packs were on loan to assistant editor Greg Vogel. The Type R did not

The Type R sports new rear hubs that allow a choice of hinge pin locations for tuning rear traction; the outermost position delivers a bit more grip but also increases chassis roll.

BUILDING & SETUP TIPS

■ Shocks.

Before installing the shocks, use

a caliper to carefully measure the length of each (at full extension) and adjust them so all are the correct length. Skip the "soft," green kit shock oil, and substitute a high-quality silicone oil; I used Schumacher* 40WT with good results.

■ **Chassis.** File the battery slots carefully before you assemble the car. Since touring-car racing can be fairly hack-intensive, it's a good idea to file the slots a bit more deeply than you would ordinarily; this will help hold the cells extra tight.

■ **Axles.** Make sure that the axles and drive hexes ("drive washers," in Kyosho-speak) are completely clean before you install them. Any oil or grease on the contact area of the parts will prevent a slip-free fit.

■ **Wheels and tires.** Use Kyosho wheels if possible; aftermarket wheels are patterned after Tamiya's hex hubs, and they are slightly smaller than Kyosho's. Aftermarket rims will fit the car, but they tend to pull the drive hexes off the axles when removing the wheels.

■ **Step 28.** The manual calls for the front shocks to be assembled with 11mm of exposed shaft and the rear shocks to be assembled with 13mm of exposed shaft—simple enough, but the manual does not tell you where to find any spacers. To arrive at the correct front-shock lengths, I installed 2mm plastic spacers from my spare parts box.

■ **Setting up for carpet.** I did the bulk of my testing at R/C Madness, where the tight on-road course, newly constructed on fresh Ozite, proved a worthy test of the TF-3's durability and handling.

To make the car race-ready, I made the following changes:

Additional/optional parts:

■ **Alien belt tensioner.** An abundance of horsepower and traction caused the TF-3 to quickly stretch its front belt. This made it skip when I got on the gas after tight, slow hairpins. Kyosho does not offer an optional belt tensioner, so I installed an Alien unit when my testing was complete.

■ **Robinson Racing pinion and spur gears.** The TF-3 includes a metric-pitch spur gear and matching pinion. These work fine, but I swapped them for Robinson gears to match the other pinions and spurs I race with.

■ **TRC Foam tires.** Foam tires are an obvious choice for carpet racing. I started with greens on all four corners but swapped the fronts for harder pinks to gain more rear bite.

■ **Kyosho tuning springs.** The stock black springs that are supplied with the TF-3 Type R are the same as the "hard" yellow springs supplied with Kyosho's On-Road Shock Spring Set. I swapped the rear springs for "medium" green springs to further increase the car's rear traction.

Additional setup notes:

■ I installed two O-rings in each shock body (in addition to the kit spacers) to reduce ride height by 4mm.

■ Each shock was set with about 1mm of sag—just enough down-travel for any dips in the carpet.

■ Each wheel was set with 0.5 degree of negative camber.

■ Front toe-in was set at 1 degree; rear toe isn't adjustable.



THE COMPETITION

	Team Losi STREET WEAPON	Yokomo YR4M2 USA	Kyosho TF-3 TYPE R	HPI RS4 PRO	Schumacher SST 2000 '98	OFNA Z10	Roadrunner XPRESS PRO
Wheelbase	10.19 in.	9.94 in.	10.1 in.	10 in.	10 in.	0.15 in.	10.25 in.
Width	7.25 in.	7.19 in.	7.5 in.	7.25/7.125 in.	7.25 in.	7.48 in.	7.4 in.
Diff type	Ball	Ball	Ball	Ball	Ball	Ball	Ball
Chassis	Composite	Graphite	Graphite	Graphite	Fiberglass	Graphite	Graphite
List price	\$349.95	\$380	\$399.99	\$329	\$369	\$379.95	\$450
Available at**	\$225	\$229	\$290	\$260	\$225	\$215	\$289
Reviewed in	12/97	11/98	2/99	10/97	12/96	4/97	4/97

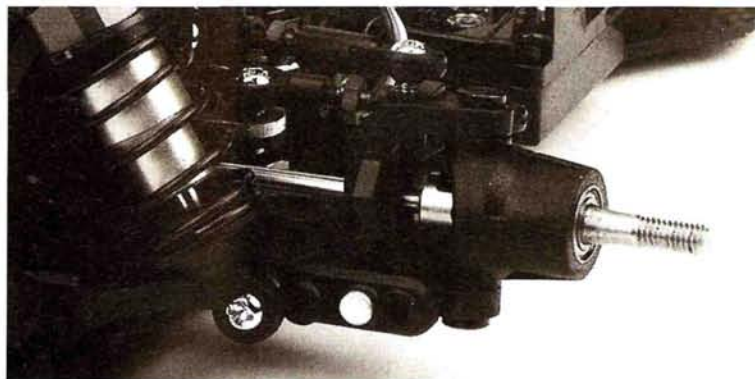
*Partial list only; product category is too large to list all competitive vehicles.

**Prices vary with location.

Kyosho includes metric 48-pitch gears with the Type R, which work well but are not interchangeable with standard 48-pitch units. I installed a Robinson spur to match my stash of pinions.

KYOSHO TF-3 TYPE R

The Type R's motor mount is a thing of beauty. It's gold anodized, 6mm thick, machined for lightness, and features captured motor screws (see the O-rings?). T-rick.



The Type R does not use the usual cross pins to secure the drive hexes; instead, each aluminum hex is friction-fit to the conical area on the steel axle. It works, but be sure to keep the wheel nuts tight.



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handle as well with the sticks, as the batteries' weight was not as evenly distributed as it had been with saddle packs. The Type R had more roll in the turns and wanted to hook when braking. It was still capable of delivering fast laps, but it was definitely less easy to drive. To make it more forgiving, I removed the one-way pulley and opted for full-time 4WD. This made the Type R easier to drive, but I lost a bit of run time.

Belt skip continued to be a problem; I hoped to solve it with an Alien* belt tensioner like the one Greg used to great effect on his OFNA Nitro Z10. Unfortunately, Madness didn't have the part on the wall, so I had to let the belt skip painfully with each run; ouch. Nothing else broke or bent, however, despite some jarring clashes with the boards.

FINAL THOUGHTS

The TF-3 Type R will be my personal carpet commando for the winter, although I do plan to make some changes. A belt tensioner is the first part I need to add, and I want to try adding the low-profile shock towers from the "standard" TF-3 for a more laid-down shock position; that should help combat chassis roll. I'll revisit the TF-3 Type R in a "2nd Look," I'm sure. In the meantime, I would consider the TF-3 Type R to be just as podium-worthy as similarly equipped sedans from HPI, Kawada, Yokomo, etc.; it has all the trick parts, and the adjustability is there. Its only real Achilles' heel is that slipping front belt. In fairness, the belt probably wouldn't be a problem off the carpet, but that's where more and more sedan racing is going on. Add a belt tensioner, and the TF-3 Type R is as good as anything out there.

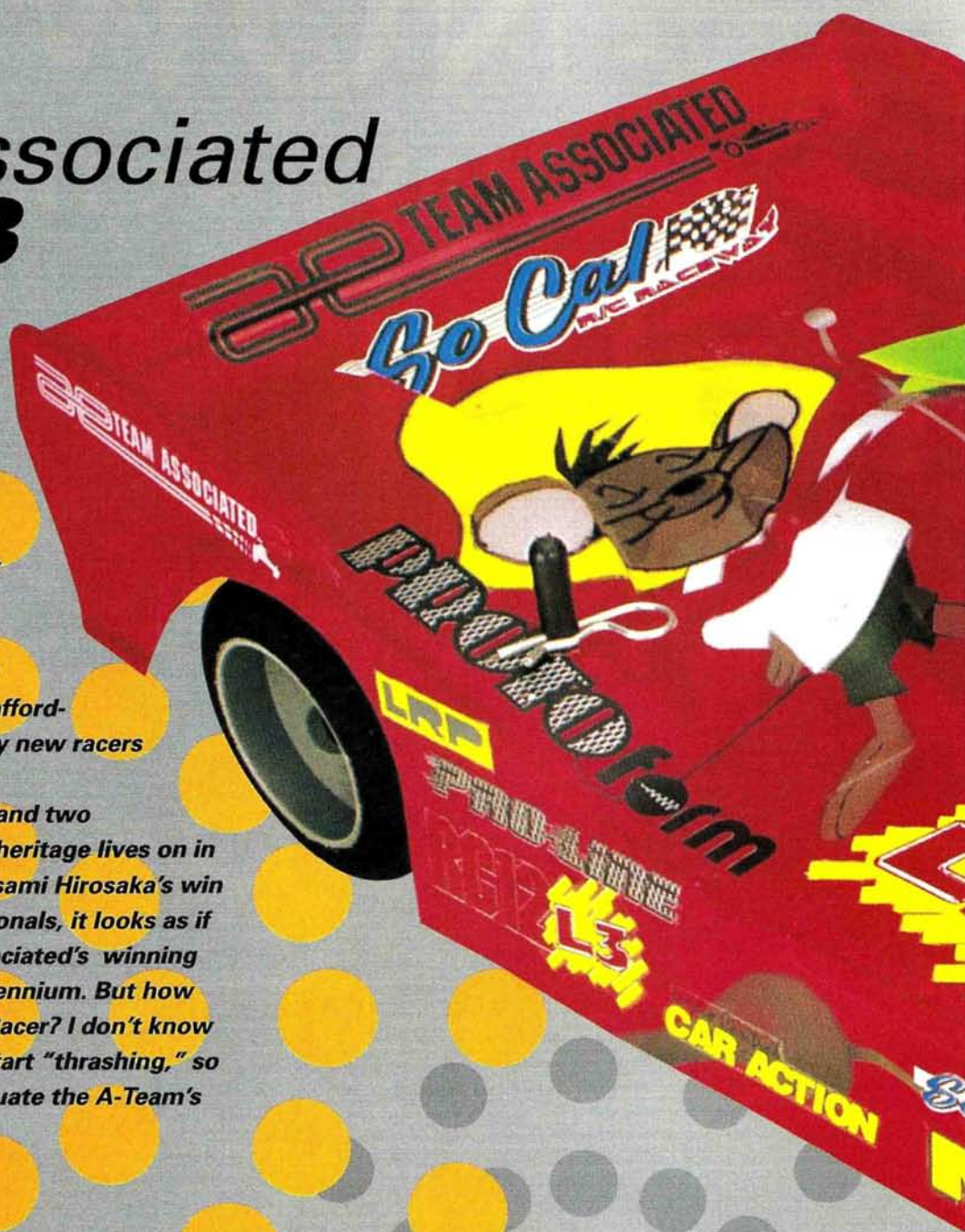
*Addresses are listed alphabetically in the Index of Manufacturers on page 225.

Team Associated **RC12L3**

by Eugene "Geno" You

Team Associated's* RC12E 1/12-scale on-road racer was one of the first American-made electric R/C cars designed just for top-level competition, and it made the winners' circle at the first IFMAR On-road World Championship. The 12E offered benchmark performance at an affordable price, and it attracted many new racers into the hobby.

Seven major championships and two decades later, the RC 12 Series heritage lives on in the new RC12L3. Following Masami Hirosaka's win with it at the '98 Japanese Nationals, it looks as if the L3 is all set to carry on Associated's winning tradition well into the next millennium. But how will it fare in the hands of Joe Racer? I don't know about Joe, but I'm anxious to start "thrashing," so read on as I build, test and evaluate the A-Team's latest road warrior.



THE LEGEND CONTINUES

s p e c s

SCALE 1/12
LIST PRICE \$230

DIMENSIONS
Length overall 13 in. (330mm)
Wheelbase 7.75 in. (195mm)
Width (F/R) 6.75 in. (170mm)

WEIGHT
Gross (RTR) 32.5 oz. (921.375g)

CHASSIS
Type Pan
Material Woven carbon fiber

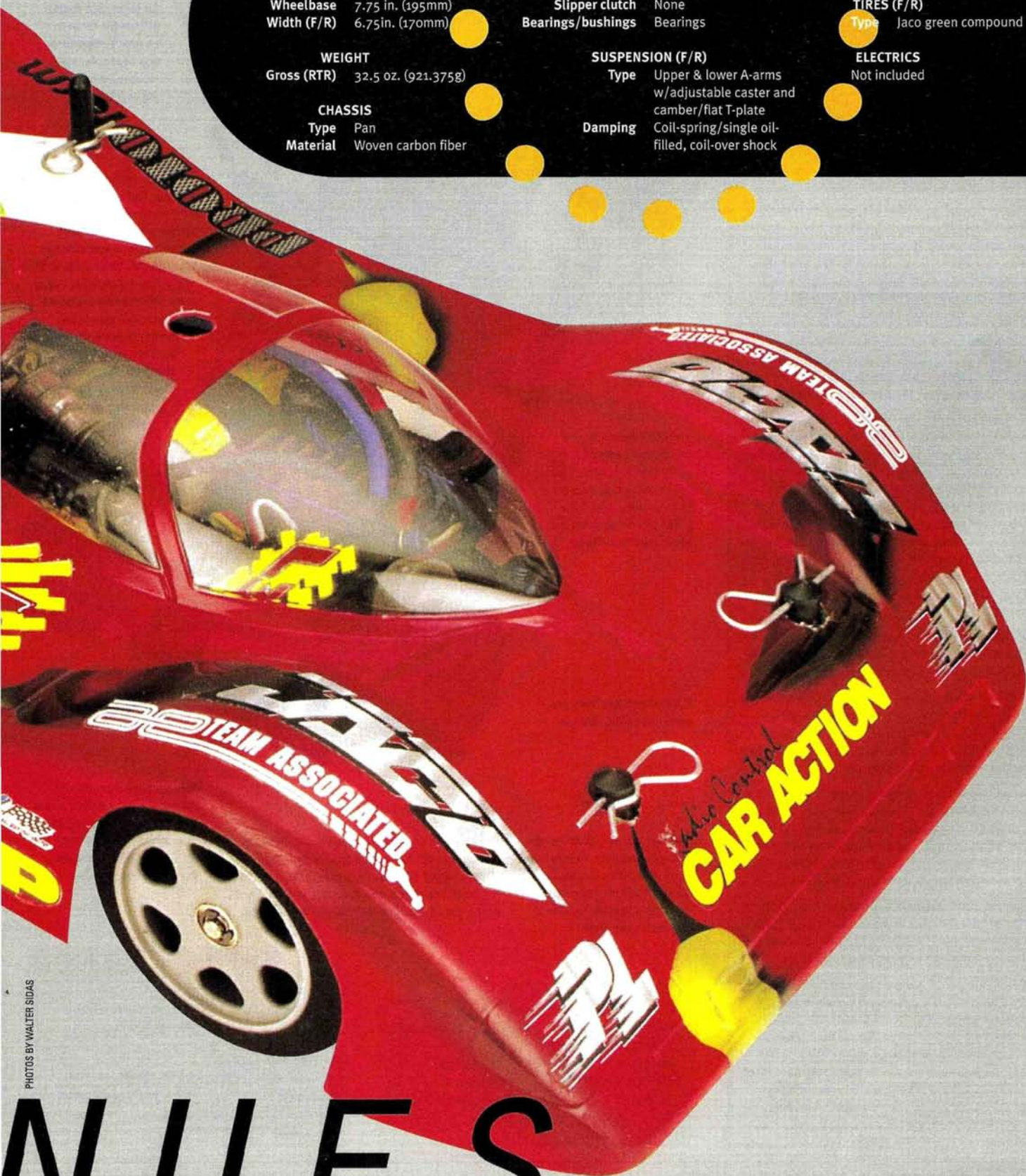
DRIVE TRAIN
Type Direct drive
Primary Pinion/spur
Transmission Straight graphite axle
Differential(s) Ball
Slipper clutch None
Bearings/bushings Bearings

SUSPENSION (F/R)
Type Upper & lower A-arms
w/adjustable caster and
camber/flat T-plate
Damping Coil-spring/single oil-
filled, coil-over shock

WHEELS (F/R)
Type Pro-Line/Jaco 1/12-
scale, GTP style,
6-spoke

TIRES (F/R)
Type Jaco green compound

ELECTRICS
Not included



PHOTOS BY WALTER SIDAS

NUES



Associated's instructions are good, but you can benefit from my experience by following these tips.

BUILDING & SETUP TIPS

■ Step 1 (page 3): before you start to thread the kit's blue 8409 aluminum screws into the tough composite pieces, do yourself a favor and use *steel* screws to start the threads. The aluminum screws look cool but are not as strong, so their heads may snap off if they're overtaxed.

■ Step 1 (page 5): be careful when you tighten the tweak screws on the T-plate; initially, the screws should contact the chassis only slightly. Make final tweak adjustments when you've completed the car and installed the electronics.

■ Step 3 (page 5): the L3's T-plate/rear pod assembly allows you to adjust T-plate flexing to subtly increase or decrease rear traction. When you mount the motor pod to the T-plate, the instructions suggest that you install screws (secured by nuts) through the two outer holes. This stock setting is just right for slippery tracks, as the plate is allowed to flex to its fullest. When racing on high-bite tracks, however, try installing a third (center) screw, but don't even blink, because the car will act like a panther on the warpath!

■ Step 6 (page 7): to ensure smooth action on both damper washers, sand all the edges on the damper plate—both sides.

■ Step 8 (page 10): when assembling the shocks, make sure that the shaft is visible through the grub-screw hole on the shock shaft end. Next, apply a drop of thread-lock to the grub screw and firmly clamp the assembly together.

■ File down the sharp outer edges of the chassis and smooth them with sandpaper. To prevent the chassis from delaminating, apply CA to its edges with a cotton swab (no joke; this is an absolute must!). While you're at it, file all the battery slots down so that they won't cut into the cells.

■ I used BRP* battery straps instead of strapping tape to hold the cells in the car. The straps hold firmly even when the car isn't on all fours! (of course, that didn't happen much to me).

■ To make your first few runs a little less unnerving, apply traction compound evenly to the surface of the rear tires, being sure to sauce the tire's entire contact patch. Sauce the front tires only around the outside edge—a tuning secret that 1/12-scale drivers use to tune their cars. After a few packs—and when you have enough confidence—use more traction compound on the fronts to balance front and rear traction.

THREE-LUG HUBS

Associated has set a new standard with these new, high-quality, machined-aluminum, three-lug hubs; they're light and strong. A user-friendly clamping left hub is also included.

GRAPHITE REAR AXLE

Associated's high-quality, precision-ground, graphite through-axle is standard equipment. The axle's screw inserts and differential housing are blue-anodized—very cool; very trick.

ADJUSTABLE T-PLATE

An ingenious design allows the tuner to control T-plate flexing—great for subtly increasing or decreasing rear traction.

VCS MICRO SHOCK

Quite a departure from the previous Delta-shock design, the new bouncer is just as smooth and consistent as Associated's larger, off-road Team Shock. The secret to its silky smooth action is inside the shock body: a special volume-compensating foam ring prevents air bubbles, which make damping inconsistent, from forming. Unlike the previous design, the new shock is also highly sensitive to shock-oil changes.

LIGHT-WEIGHT CARBON-FIBER CHASSIS

The L3's chassis is lighter and just as strong as its predecessor's. The upper damper plate, rear chassis plate and T-bar brace are all made of the same quality material.

BALL BEARINGS

Precise ball bearings are used throughout the car.

PRO-LINE/JACO WHEELS AND TIRES

Medium-compound green-dot tires are mounted on 6-spoke black GTP wheels. This is a great set of tires to start with, since they provide excellent grip and wear well.

DYNAMIC-STRUT FRONT SUSPENSION

Associated's race-proven system has been carried over to the L3. Simple spacer positioning allows caster adjustment, while turnbuckles control camber and toe-in/out. A carbon-fiber front brace provides super-stiff suspension rigidity.

COOL BLUE STUFF

Blue titanium tie rods, aluminum screws and ball joints. These are parts you would have bought anyway and they're included in the kit. Way to go, men in blue!

YOU'LL NEED

- High-quality 2-channel transmitter and receiver.
- Miniature steering servo.
- ESC.
- Motor.
- 4- to 6-cell battery pack.
- Racing body.
- Lexan paint.
- Servo-saver for 1/12 scale.

FACTORY OPTIONS

- Factory Team blue parts
- aluminum right bulkhead—part no. 4537B.
- chassis-brace standoffs—4442B.
- left hub—4552B.
- right hub—4553B.
- Magnesium right bulkhead—4538.
- Carbon-fiber-composite left bulkhead—4541.
- Titanium front axles—1599.
- 4.0 black springs (soft)—4475.

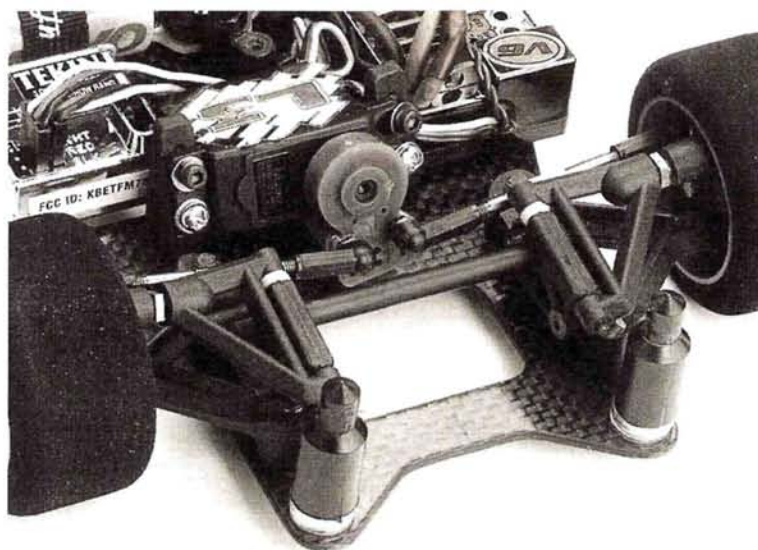
TEST GEAR

• LRP* V6 speed control • Tekin* mini FM receiver • Hitec* HS 235AG miniservo • Reedy* Zappers RC2000 matched cells • Reedy Firehawk 24-degree stock motor • Protoform* 1/12-scale body custom painted by Todd Amann • BRP battery straps

- Competition ready; no need for hop-ups.
- Cool blue aluminum screws and titanium turnbuckles.
- New, lighter, woven-carbon-fiber chassis.
- Awesome new VCS shock.
- Proven dynamic-strut front end.
- Jaco/Pro-Line tires and wheels combo.

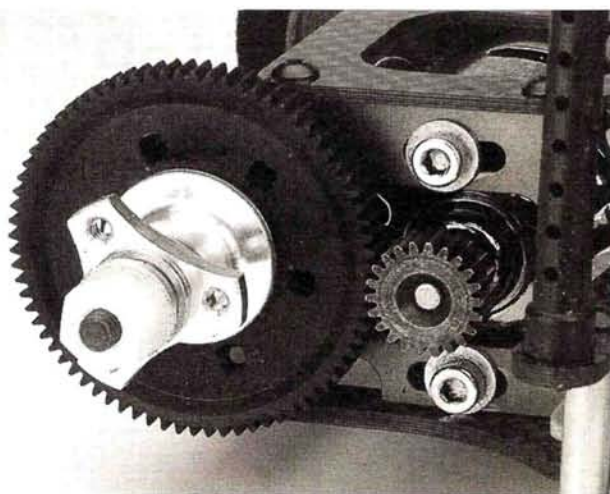


- Have to use strapping tape to mount the batteries.
- I still can't drive it like Master Masami!

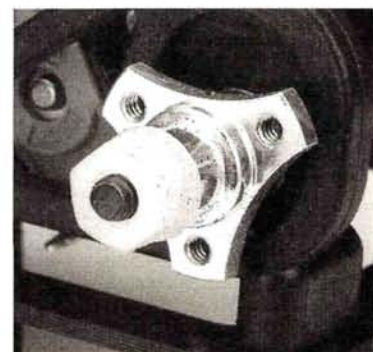
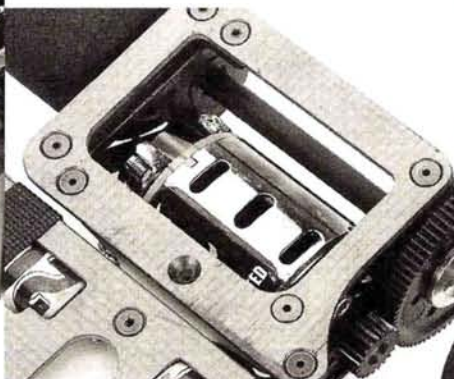


The L3's front end incorporates Associated's tried-and-true Dynamic-strut front suspension. All the Factory Team blue stuff (titanium tie rods, screws and ball joints) is included in the box. (Thank you, Associated.) The Pro-Line/Jaco wheels and green-compound rubber are also standard issue.

Below: the L3 comes equipped with an Associated graphite through-axle. The aluminum diff pieces are all anodized blue to match the rest of the car.



Below: the motor pod was redesigned to make it much easier to change motors and gear ratios. T-plate flexing can be adjusted to allow subtle changes in rear traction. Pro-Line/Jaco wheels and tires are found back here, too.



Above: the L3 includes a light-weight clamping left hub—a welcome addition. Notice that the L3's hubs feature a new three-lug design.

PERFORMANCE

The RC12L3 made its first run at So Cal Raceway in Huntington Beach, CA. The track always has gobs of traction, and the staff always set up a challenging layout.

The first couple of turns proved that I had way too much steering, so I simply dialed some out by adjusting my radio's dual rate from 100 to 40 percent. The key with 1/12-scale cars is to program just enough steering to get you around the infield—and that's it.

At the same time, I noticed that the stock green-compound tires provided a dequate traction, but I opted to try Jaco purple-compound fronts and pink-compound rears, as recommended by several of the drivers who frequent the track.

After all the initial adjustments and changes had been made, it was time to see what the car was made of. The stock motor provided incredible acceleration and always pulled away—especially in the infield—from the modified 4WD sedans

that shared the track during practice. The L3 negotiated its way around with pinpoint accuracy, and the transitions were as smooth as silk; the car was on rails!

Though the stock setup was close to perfect, I took my friend Charlie Suangka's advice and tried a simple caster/camber change. I didn't notice any change at first, but the adjustments made a big difference in the infield, where the car was much more forgiving. At the same time, the tire swap was just right because the L3 remained glued to the track no matter how hard and fast I went into the turns.

After many battery packs, I decided to step into the fast lane, so I bolted in a 15-turn single modified motor. I hung on to my 3PS, as the 12L3 shot down the straightway. I can't begin to describe the speed that was in front of me. I kept my eyes wide open during the entire 8 minutes because I was afraid to blink (nearly dried out my contact lenses).

FINAL THOUGHTS

Judging from the attention the L3 was given and the enthusiasm it generated at the track, 1/12-scale racing can only become more popular. The local on-road drivers just could not believe all the extra goodies that Team Associated has incorporated into the kit. What a fantastic deal!

If you want to become a better driver, the RC12L3 is an absolute must. Driving a 1/12-scale car will greatly improve your steering and throttle responses and quicken your reflexes. Master Masami Hirosaka once told me that he practices with his 1/12-scale car whenever he needs to tune up his driving skills. The Team Associated RC12L3 is a clear winner that's ready, willing and able to listen to your every R/C command.

**Addresses are listed alphabetically in the Index of Manufacturers on page 225.*



PROJECT HPI NITRO RS4

by Steve Pond

Oh sure, this project started out innocently enough: a simple mission to transform one HPI* Nitro RS4 into a Pro version that would be even more trick than HPI's own Racer kit using HPI's many hop-up options. But the Nitro RS4's immense popularity has motivated more companies than HPI to offer accessories for it; in fact, before I was able to sit down and start building just one tricked-out Nitro RS4, I had enough parts from three other popular manufacturers to build four wild cars. How could I resist?

The following pages show what may be considered the trickiest, most well-equipped Nitro RS4s on the planet. Not one was built as the ultimate performance machine; instead, each is a showcase for the manufacturers that offer the most comprehensive line of parts for the Nitro RS4. Some of the parts are purely for performance enhancement, while others are strictly eye candy. Whatever your pleasure, dig in for a taste of some of the hottest high-tech hardware for the top fueler of nitro touring cars!

We build the *nitro*
ultim



RS4
ates

CROSS RACING



BODY PAINTED BY MIKE OGEL

Cross* manufactures what I consider to be the ultimate high-quality, precision R/C car parts; they display a blend of style and performance that hasn't yet been equaled. Cross parts don't have the bright, flashy colors seen with parts from other manufacturers, but a trained eye can immediately pick out what separates Cross offerings from the rest of the pack: they get their striking appearance from their incredibly superior machining that more than makes up for the absence of color choices.

The finely machined parts are of high-quality aluminum that combines strength and durability while keeping component weight to a minimum, and each is finished with Cross's trademark bright-silver anodizing.

Though assembling a car using Cross components requires a little screw chasing, all the parts used on this car fit perfectly!

- ❶ CROSS 3MM ALUMINUM CHASSIS PLATE
- ❷ CROSS LOWER FRONT MOUNT
- ❸ CROSS FRONT BULKHEADS
- ❹ CROSS FRONT HUB CARRIERS
- ❺ CROSS FRONT STEERING HUBS
- ❻ CROSS 1-DEGREE REAR HUB CARRIERS
- ❼ CROSS COUNTER-BLOCKS
- ❽ CROSS OUTER GEAR-SHAFT BULKHEAD/BRAKE BLOCK
- ❾ CROSS REAR BULKHEADS

- HPI GRAPHITE UPPER DECK
- HPI GRAPHITE REAR BRACE
- HPI GRAPHITE SHOCK TOWERS
- HPI GEAR-BRACE SET/BELT TENSIONER
- HPI FIBER BRAKE DISK

TOP 24MM WHEELS W/TOP FIRM INSERTS
AND KAWADA LS-240 BELTED SLICKS

TEAM ASSOCIATED TWO-STAGE AIR FILTER

TEAM ASSOCIATED FACTORY
TEAM TITANIUM
TURNBUCKLES

DU-BRO FUEL FILTER

TEAM ORION 1000MAH
NI-MH RECEIVER BATTERY PACK

NOVAROSSİ TOP C12 ENGINE

CVEC TUNED PIPE

KYOSHO EXHAUST COUPLER

HG MACHINED-LEXAN SHOCK BODIES

HG TITANIUM HINGE PINS

HG 3MM TITANIUM BALL ENDS

MIP SHINY CVD DRIVE SHAFTS

ALIEN 32MM FLYWHEEL

- HPI 2-SPEED TRANSMISSION
- HPI BALL DIFFERENTIALS
- HPI 15MM HEAT-SINK ENGINE MOUNTS
- HPI EXHAUST HEADER
- HPI SWAYBAR SET
- HPI 1.7 PURPLE/1.6 GREEN SPRINGS
- HPI PRECUT FOAM BUMPER
- HPI C5 CORVETTE BODY



Above: this optional gear-shaft brace should be used in every application. It prevents the gear shaft from flexing and maintains proper gear mesh/belt tension. It's essential if you use a 2-speed transmission in which proper gear mesh is critical. Left: the quality of the Cross suspension components used here is unparalleled. The stock suspension arms maintain some flexibility and allow the use of the HPI swaybar kit.



Alien* is gaining recognition for offering the most attractive accessories for the HPI Nitro RS4. Its line of high-quality, machined-aluminum parts are brightly anodized in a number of colors to give a custom look that stands out from as far away as 50 feet. But not only do these parts look good, they also fit and work very well. All Alien parts come with the hardware required for installation, so they're just about as easy to install as the HPI factory parts.

The Alien line leaves the stock suspension untouched and instead focuses on the chassis components. In fact, when a full-tilt Alien car is assembled, the only remaining stock chassis piece is the outer gear-shaft bulkhead! Alien also offers an excellent alternative to the HPI gear brace set/side belt tensioner, and it matches the dazzling colors offered on the rest of the components.

ALIEN ALIEN A

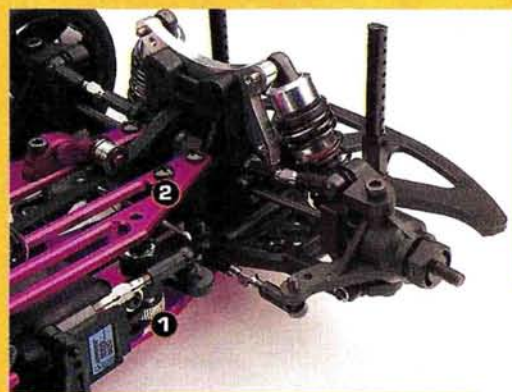


BODY PAINTED BY SOTT BRANCHE



- HPI UNIVERSAL DOGBONES
- HPI BALL-BEARING SET
- HG ALLOY PULLEY SHAFTS
- HG ALLOY SHOCK TOWERS
- HG MACHINED-LEXAN SHOCK BODIES
- PARIS RACING/BRUCKNER PURPLE-ANODIZED TURBO RING TUNED PIPE
- KYOSHO EXHAUST COUPLING
- TOP 24MM 6-SPOKE WHEELS W/HPI FIRM MOLDED INSERTS AND PRO-LINE V-RAGE S3 TIRES

- ALIEN 3.15MM ALUMINUM CHASSIS PLATE 1
- ALIEN UPPER DECK 2
- ALIEN REAR BRACE 3
- ALIEN UNIVERSAL FRONT-BELT TENSIONER 4
- ALIEN GEAR SHAFT-BRACE/BELT TENSIONER 5
- ALIEN 32MM LIGHTWEIGHT FLYWHEEL 6
- ALIEN UNIVERSAL ENGINE MOUNTS 7
- ALIEN INNER GEAR-SHAFT BULKHEAD W/REAR BELT TENSIONER 8



Above: the Alien chassis and upper plate are the most colorful combo of the bunch. The optional Alien universal belt tensioner helps prevent the front belt from skipping when it starts to stretch. Note the use of the HG alloy shock towers and machined-Lexan shock bodies. Right: Alien offers a very functional, sharp-looking gear-shaft brace.



- HPI EXHAUST HEADER ■
- HPI FIBER BRAKE DISK ■
- O.S. .12 CV ENGINE W/O'DONNELL RACING CYLINDER HEAD ■
- TEAM ORION 600MAH 5-CELL NI-CD RECEIVER BATTERY PACK ■
- YOKOMO PRECUT FOAM BUMPER ■
- TEAM ASSOCIATED TWO-STAGE AIR FILTER ■
- DU-BRO FUEL FILTER ■

HPI HPI HPI HPI



BODY PAINTED BY SOTT BRANCHE

HPI hop-up parts get the highest points for ease of installation—as perhaps they should because they're made by the RS4's manufacturer. No disappointments here; in fact, the custom Nitro RS4 we built using HPI parts was the most trouble-free of the group.

All parts came with detailed instructions and all the necessary installation hardware. Included hardware might not sound like a big deal, but try building one of these monsters—never mind four of them—when you have to make numerous trips to the hobby shop to get the screws you need to finish the job. It gets old pretty quick!

Compared with those of the other manufacturers featured here, HPI's lineup of Nitro RS4 chassis accessories looks rather sparse, but the parts HPI does offer deliver significant performance increases. In addition, HPI offers a 2-speed transmission, ball differentials, graphite shock towers, graphite upper plates, swaybars and other accessories that aren't available from other sources.

- 1 HPI GRAPHITE UPPER DECK
- 2 HPI GRAPHITE REAR BRACE
- 3 HPI GRAPHITE SHOCK TOWERS
- 4 HPI 2-SPEED TRANSMISSION
- 5 HPI GEAR-BRACE SET
- 6 HPI SWAYBAR SET
- 7 HPI FIBER BRAKE DISK
- 8 HPI NITRO RS4 SUPER CHASSIS
- 9 HPI BALL-DIFF SET
- 10 HPI 15MM HEAT-SINK ENGINE MOUNTS
- 11 HPI 32MM LIGHTWEIGHT FLYWHEEL
- 12 HPI EXHAUST HEADER
- 13 HPI 26MM SUPERSTAR WHEELS W/HPI MOLDED INSERTS AND BELTED SUPER SLICKS

TEAM ORION NI-MH 1000MAH RECEIVER ■
BATTERY PACK

MIP SHINY CVD DRIVE SHAFTS ■
DYNAMITE .12 SPD ENGINE ■

- YOKOMO PRECUT FOAM BUMPER
- CVEC TUNED PIPE
- KYOSHO EXHAUST COUPLER
- TEAM ASSOCIATED TWO-STAGE AIR FILTER
- DU-BRO FUEL FILTER



Above: MIP Shiny CVD drive shafts reduce slop in the drive system and smooth power delivery. Team Associated's two-stage air filter offers a better balance of air-flow and filtering than any other air filter I've used. Left: on the HPI car, I kept most of the stock suspension components. To eliminate unwanted flexing when using the stock parts, I later installed drag links from the tops of the hub carriers to the upper chassis plate.

TOP TOP TOP TOP



BODY PAINTED BY SOTT BRANCHE



- 1 TOP 4MM CHASSIS PLATE
- 2 TOP FRONT BULKHEADS
- 3 TOP STEERING BELLCRANKS
- 4 TOP FRONT HUB CARRIERS
- 5 TOP FRONT STEERING HUBS
- 6 TOP REAR AXLE HUBS
- 7 TOP COUNTER-BLOCKS
- 8 TOP REAR BULKHEADS
- 9 TOP INNER GEAR-SHAFT BULKHEAD

- ALIEN UNIVERSAL BELT TENSIONER
- ALIEN GEAR-SHAFT BRACE/BELT TENSIONER
- HG ALLOY PULLEY SHAFTS
- PRO-LINE PREMOUNTED SLICKS
- O.S. .12 CV ENGINE W/O'DONNELL RACING CYLINDER HEAD

We can credit TOP* with supplying all the parts needed to build the "Terminator" of Nitro RS4s. The most striking component in TOP's parts lineup is what I call the "franken-chassis"—a 4mm-thick aluminum chassis plate that looks as if it could chop down a light pole before it would show any signs of significant damage! Ironically, despite its super-thick chassis, the TOP-equipped car weighed in at the lighter end of the scale.

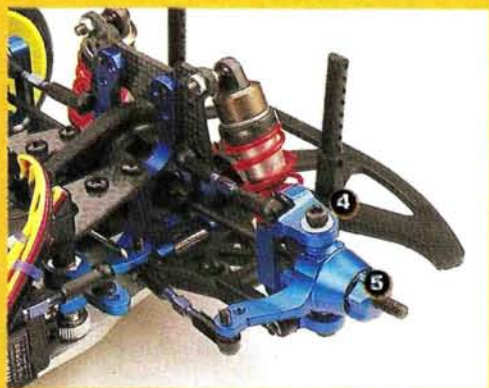
Worth noting is that the chassis shortens the distance between the front-drive-belt pulleys, and that requires the use of a front-belt tensioner.

TOP's lineup of course includes a number of other machined-aluminum accessories that improve the Nitro RS4 platform while offering a bonus of a little flair provided by a choice of anodized colors.

- HPI GRAPHITE UPPER DECK
- HPI GRAPHITE REAR BRACE
- HPI GRAPHITE SHOCK TOWERS
- HPI EXHAUST HEADER
- HPI FIBER BRAKE DISK
- HPI UNIVERSAL DOGBONES
- HPI BALL-BEARING SET
- HPI LAMBORGHINI DIABLO VT BODY

- CVEC TUNED PIPE
- TEAM ORION 600MAH 5-CELL NI-CD RECEIVER PACK
- YOKOMO PRECUT FOAM BUMPER
- TEAM ASSOCIATED FACTORY TEAM TITANIUM TURNBUCKLES
- TEAM ASSOCIATED TWO-STAGE AIR FILTER
- DU-BRO FUEL FILTER
- ALIEN 32MM LIGHT-WEIGHT FLYWHEEL
- ALIEN UNIVERSAL ENGINE MOUNTS

TOP aluminum suspension components do a great job of eliminating flexing. The steering hubs had to be hand-fitted because the tolerances were a little off and there was some binding in the steering movement.



Factory Team titanium turnbuckles not only work very well, but they nicely match the blue anodizing of the TOP parts, too. The blue-anodized Alien gear-shaft brace matches the blue of the TOP parts. Note the aluminum wheel adapters from TOP.

SPECIFICATIONS

CROSS RACING

■ CROSS PARTS

	PART NO.	WEIGHT	LIST PRICE
—3mm aluminum chassis plate	CH-19	111.2g	\$103.99
—lower front mount	CH-49	11.2g	\$44.99
—front bulkheads	CH-48	28.8g	\$57.99
—front hub carriers	CH-39	12.4g	\$44.99
—front steering hubs	CH-35	10.1g	\$41.99
—1-degree rear hub carriers	CH-52	10.5g	\$41.99
—counter blocks	CH-51	7.7g	\$38.99
—outer gear shaft bulkhead/brake block	CH-13	5.9g	\$38.99
—rear bulkheads	CH-53	33.8g	\$41.99

■ HPI PARTS

—graphite shock tower (F/R)	A570/A218	3/5.9g	\$10/\$18
—graphite upper deck	A930	22.8g	\$21
—graphite rear brace	A935	5.7g	\$10
—gear-brace set/belt tensioner	A907	7.4g	\$34
—fiber brake disc	A844	4g	\$14
—2-speed transmission	A910	61g	\$69
—ball differentials	A905	26.6g	\$35 each
—15mm heat-sink engine mounts	A920	7.4g	\$45
—exhaust header	A950	11.5	\$32
—swaybar set	A209	NA	\$21
—1.7 purple springs	6839	NA	\$4.50
—1.6 green springs	6837	NA	\$4.50
—precut foam bumper	6274	NA	\$5
—C5 Corvette body	7039	NA	\$22

■ HG PARTS

—machined Lexan shock bodies (pair)	5300	5.7g (4)	\$12.95
—titanium hinge pins (set)	8220	8.5g	\$19.95
—3mm titanium ball ends (set of four)	8314	2.3g (4)	\$7.95

■ TOP PARTS

—24mm 6-spoke wheels	T3380	NA	\$5
—firm inserts	T3399	NA	\$3.99

■ TEAM ASSOCIATED PARTS

—2-stage air filter	7705	NA	\$7.50
—Factory Team titanium turnbuckles	1352	5.7g	\$27
■ Team Orion 1000mAh Ni-MH receiver pack	AT1002H	93g	\$45
■ NovaRossi Top C12 engine	TBA	199.9g	TBA
■ CVEC tuned pipe	Z120	50.8g	\$57.95
■ Kyosho exhaust coupler	92601BK	NA	\$12.99
■ MIP Shiny CVD drive shafts (pair)	1204/1206	40g (4)	\$35
■ Alien 32mm lightweight flywheel	WLF016	12.2g	\$18.99
■ Kawada LS-240 belted slicks (pair)	TU-33M	NA	\$14.50
■ Du-Bro fuel filter	341	2.8g	\$2.39

Total weight (RTR): 54.5 oz. (1,545g)



ALIEN

■ ALIEN PARTS

	PART NO.	WEIGHT	LIST PRICE
—3.15mm aluminum chassis plate	WLF001	120.4g	\$45.99
—upper deck	WLF002	37.1g	\$24.99
—rear brace	TBA	8.9g	TBA
—universal front belt tensioner	WLF006	5.7g	\$24.99
—gear-shaft brace/belt tensioner	WLF013	9.7g	\$33.99
—32mm lightweight flywheel	WLF016	12.2g	\$18.99
—universal engine mounts	WLF003	7.8g	\$18.99
—inner gear-shaft bulkhead w/belt tensioner	WLF008	13.5g	\$33.99

■ HPI PARTS

—exhaust header	A950	11.5g	\$32
—fiber brake disc	A844	4g	\$14
—universal dogbones (F/R)	A513/A514	38.1g (4)	\$34
—ball-bearing set	B041	26.2g	\$59.99
—firm molded inserts	4679	NA	\$5

■ HG PARTS

—alloy pulley shafts	1113	7.1g	\$9.95
—alloy shock towers (set of 3)	2105	20.1g (2)	\$34.95
—machined Lexan shock bodies (pair)	5300	5.7g (4)	\$12.95
■ Paris Racing/Bruckner purple tuned pipe	AL12TP	34.2g	\$39.99
■ Kyosho exhaust coupler	92601BK	NA	\$12.99
■ TOP 24mm 6-spoke wheels	T3380	NA	\$5
■ Pro-Line V-Rage S3 tires	1091S3	NA	\$12.50
■ O.S. 12CV engine	OSMG2010	201.5g	\$179.99
■ O'Donnell Racing cylinder head	OD01200P	42.5g	\$29.95
■ Team Orion 600 mAh 5-cell Ni-Cd receiver pack	AT0602H	93g	\$26
■ Yokomo precut foam bumper	ZR001FS	NA	\$5.75
■ Team Associated 2-stage air filter	7705	NA	\$7.50
■ Du-Bro fuel filter	341	2.8g	\$2.39

Total weight (RTR): 52.7 oz. (1,494g)

But is it
FAST?



With four of the trickiest RS4s in the planet sitting next to my desk, curiosity got the better of me. I had to know: how fast was the fastest of these monster cars?

In the opinion of our editors, including me, the Cross-equipped car with the TOP C12 engine was the fastest, and we thought it would go even faster with appropriate gearing. For second gear in the optional 2-speed transmission, in place of the 41-tooth spur, I installed a 37-tooth spur along with a 13/20T clutchbell—the tallest gearing available from HPI.

With the Cross car suitably prepped, I needed only a safe speed-run site; public roads were out of the question. The staff of Sikorsky Memorial

HPI

HPI PARTS

	PART NO.	WEIGHT	LIST PRICE
—graphite upper deck	A930	22.8g	\$21
—graphite rear brace	A935	5.7g	\$10
—graphite shock towers (F/R)	A570/A218	3/5.9g	\$10/\$18
—2-speed transmission	A910	61g	\$69
—gear-brace set/belt tensioner	A907	7.4g	\$34
—swaybar set	A209	NA	\$21
—fiber brake disk	A844	4g	\$14
—Nitro RS4 3mm Super chassis	A903	115.5g	\$95
—ball differentials	A905	26.6g	\$35 each
—15mm heat-sink engine mounts	A920	7.4g	\$45
—exhaust header	A925	11.5g	\$20
—26mm Super Star wheels	3696	NA	\$6/pair
—firm molded inserts	4679	NA	\$5/pair
—belted Super Slicks	4415	NA	\$15.50/pair
■ Team Orion Ni-MH 1000mAh receiver battery pack	AT1002H	93g	\$45
■ MIP Shiny CVD drive shafts	1204/1206	40g (4)	\$35/pair
■ Dynamite .12 SPD engine	DYN6507	192.1g	\$159.95
■ Yokomo precut foam bumper	ZR001FS	NA	\$5.75
■ CVEC tuned pipe	Z120	50.8g	\$57.95
■ Kyosho exhaust coupler	92601BK	4.8g	\$12.99
■ Team Associated 2-stage air filter	7705	NA	\$7.50
■ Du-Bro fuel filter	341	2.8g	\$2.39

Total weight (RTR): 54.2 oz. (1.536g)



Airport in Bridgeport, CT, was kind enough to let assistant editor Greg Vogel and me use the taxiway and runway—enough space to reach top speed. Officer Williams of the Bridgeport PD was entrusted with the task of clocking the car with his laser speed gun (I think he was also itching to zap Greg's Eagle Talon).

After a few warm-up passes, officer Williams aimed the ticket-ray at the Cross-equipped RS4 as it howled past. The car squeezed out a run of 57mph before it was even dialed in, but a spectacular blow-over prematurely ended the day. I'm bet-the-farm confident that with a few more tweaks to the C12's still-rich main mixture needle (it was only running at 193 degrees!), the Cross car would have easily pushed past the 60mph mark.

Although there is no established speed record for a Nitro RS4, this will at least give you a mark to shoot for. Don't be fooled by one of those "It looks like it was going this fast" speed assessments. By that measure, this car was goin' over a 100mph!

Thanks to Sikorsky Memorial for letting us play on the runway, and special thanks to the Bridgeport PD and the agile officer Williams (I almost took him out with the speeding RS4, and he jumped mighty quick!).

TOP

TOP PARTS

	PART NO.	WEIGHT	LIST PRICE
—4mm chassis plate	T3802	186.7g	\$59.95
—front-suspension bulkheads	T3806	28.8g	\$39.95
—steering bellcranks	T3811	8.7g	\$19.95
—front hub carriers	T3819	12.8g	\$19.95
—front steering hubs	T3815	10.9g	\$19.95
—rear hub carriers	T3814	10.8g	\$19.95
—counter blocks	T3812	7.3g	\$19.95
—rear-suspension bulkheads	T3807	38.1g	\$39.95
—inner gear shaft bulkhead	T3813	10.9g	\$39.95

HPI PARTS

—graphite upper deck	A930	22.8g	\$21
—graphite rear brace	A935	5.7g	\$10
—graphite rear shock tower	A218	5.9g	\$18
—graphite front shock tower	A570	3g	\$10
—exhaust header	A950	11.5g	\$32
—fiber brake disk	A844	4g	\$14
—universal dogbones (pairs, F/R)	A513/A514	38.1g (4)	\$34
—ball-bearing set	B041	26.2g	\$59.99
—Lamborghini Diablo body	7099	NA	\$22

ALIEN PARTS

—32mm lightweight flywheel	WLF016	12.2g	\$18.99
—universal engine mounts	WLF003	7.8g	\$18.99
—universal belt tensioner	WLF006	6.2g	\$24.99
—gear-shaft brace/belt tensioner	WLF013	9.7g	\$33.99

HG PARTS

—alloy pulley shafts	1113	7.1g	\$9.95
—machined Lexan shock bodies (pair)	5300	5.7g (4)	\$12.95
■ O.S. .12 CV engine	OSMG2010	201.5g	\$179.99
■ O'Donnell Racing cylinder head	OD01200A	42.5g	\$29.95
■ CVEC tuned pipe	Z120	50.8g	\$57.95
■ Team Orion 600mAh 5-cell Ni-Cd receiver pack	AT0602H	93g	\$26
■ Pro-Line premounted slicks	2992	NA	\$34.50/pair
■ Yokomo precut foam bumper	ZR001FS	NA	\$5.75
■ Team Associated parts			
—Factory Team titanium turnbuckles	1352	5.7g	\$27
—2-stage air filter	7705	NA	\$7.50
■ Du-Bro fuel filter	341	2.8g	\$2.39

Total weight (RTR): 54.1 oz. (1.534g)



FINAL THOUGHTS

Building these cars was no small task. Whenever you get into the level of modification shown here, you can be sure that you'll make quite a few trips to the hobby shop for extra fasteners and many other unforeseen necessities; it's simply the nature of the beast (with the possible exception of a pure HPI car). The task is further complicated by the addition of such parts as aluminum concave washers and other "eyeball" items.

If I learned one thing from this project—other than that I should never again build four custom cars simultaneously—it's that when it's all over, there's the satisfaction of having built one of the trickiest custom Nitro RS4s ever!

*Addresses are listed alphabetically in the Index of Manufacturers on page 225. ■

BUDGET FM R

SIX SYSTEMS

COME ON; you deserve it. You've been using that old AM radio since forever. It served you well, but you're ready for the convenience, power and tunability of an FM system. Now, don't give me that "But-I-can't-afford-it" look. There are more budget-conscious FM radios on the market than ever before, and one is sure to fit your needs and funds. Of course, deciding is never easy, so we're happy to provide all the specs on the latest high-power pistols along with helpful sidebars on radio terminology and tuning. Now you can sound like you know what you're talking about when you pester the guy at the hobby shop!

GLOSSARY OF TERMS

- **ABS:** similar to the automatic braking system in a full-size car, R/C ABS causes the throttle/brake servo to pulse at a user-set rate to avoid lockup.
- **Battery alarm:** sounds when a radio's battery voltage falls below its requirements for reliable operation.
- **Channels:** most car radios are 2-channel—one for steering, another for throttle/brake. The additional channel(s) of multi-channel transmitters are rarely exploited in cars but can be useful for onboard needle-valve adjustment, articulated wings and driver figures and other functions. Most radios with a third or fourth channel offer different modes of operation for the additional channel(s).
- **Endpoint adjustment (EPA):** generally preceded by "throttle" or "servo" to indicate the channel that is being adjusted.

AIRTRONICS CX2P

Sure, it looks like the Caliber, but the CX2P skips the LCD screen in favor of can't-miss analog controls. One dial, one function—no problem. Southpaws and ambidextrous types will dig the CX2P's left-hand adaptability, and a plug-in RF module allows easy conversion from 27 band to 75 (and vice versa). Most racers like the CX2P's offset-wheel design, but (as with any radio you're considering) you should handle one yourself before you buy.

HITS

- Fully featured, yet simple to use.
- Left-hand adaptable.

MISSES

- Tiny dials can be awkward to manipulate without a tool.



FUTABA 3PDF

The 3PDF was instantly embraced by club racers and enthusiasts when it first appeared, and with good reason: it's reliable and has all the features you really need for racing. A third channel is great for scale projects, and independent brake and throttle exponential is a bonus. The conventional wheel-above-the-thumb layout is comfortable, and the digital trim buttons prevent accidental setting changes while the radio is off; no more goofed-up trims when your radio comes back from impound. Three-model memory and user-assigned grip buttons allow you to tailor the 3PDF to your needs.

HITS

- Futaba quality and reliability.
- Independent forward and brake expo.

MISSES

- No RF module; dedicated 75 or 27MHz operation only.



RADIO GUIDE

ORDER \$ 230 by Peter Vieira

HITEC

Lynx FM

The Lynx offers basic functions in an FM package at a very low price. If you're looking to go FM for signal clarity and aren't interested in fine-tuning functions, this radio is a great buy.

Throttle EPA helps with gas-car setup, and dual-rate steering with override button (a Hitec exclusive) is a plus for any racer. However, the Lynx FM is not for guys with meaty mitts, as the grips are a little small.

HITS

- Nice price.
- Reliable operation—no glitches.

MISSES

- The grip area is small and has a funky shape.
- Tool required to adjust throttle and steering EPA.



HITEC

Lynx 3D

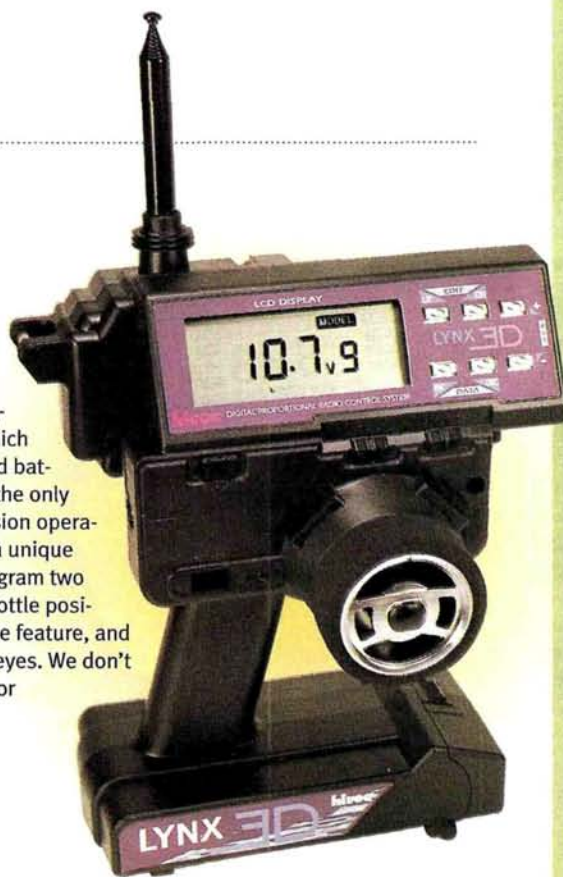
Since this is a budget-radio guide, the transmitters featured are not each manufacturer's top-of-the-line models—except for the Lynx 3D. So why include Hitec's high-end, digital-display, everything-but-the-kitchen-sink radio? Because of its price, which should come in at just a click over \$200—with Ni-Cd batteries and charger! As Hitec's best effort, the 3D is the only radio (budget or otherwise) to feature dual-conversion operation for super glitch resistance. The 3D also offers a unique feature, Auto Dual Rate, that allows the user to program two steering dual-rate settings that are activated by throttle position—trick stuff. Left-hand adaptability is a welcome feature, and the large-format LCD-screen display is easy on the eyes. We don't have a production 3D yet, so no word on reliability or "misses" to report.

HITS

- Most comfortable transmitter Hitec has offered.
- Includes Ni-Cds and charger.

MISSES

- No verdict yet; Hitec did not have a production spec Lynx 3D for review.



This setting determines the total range of servo travel from full left to full right. In most cases, left and right throws can be adjusted independently with this function—especially useful when setting up throttle linkages for gas vehicles. Also known as ATV (adjustable travel volume).

• **Exponential (EXP):** allows the user to adjust the throttle or steering servo's responsiveness around the neutral setting. For example, if steering exponential is set for a negative value, the servo will move less relative to the movement of the steering wheel near neutral, and will move more relative to the input at the steering wheel as it reaches the limit of its travel. Conversely, a positive value causes the servo to feel more responsive around neutral and less responsive at the limits of travel. The greater the value input to the radio, the greater the difference in servo speed from most to least responsiveness.

• **Left-hand adaptable:** radios with this feature may be reconfigured for left-handers.

• **Model memory:** a very helpful feature that allows the radio to store your custom settings for several models. This eliminates the need to tediously reprogram when you swap the radio between vehicles. With a touch of a button, you can switch from 1/8-scale buggy settings to 1/12-scale carpet car mode; some radios can store settings for as many as 10 models.

• **Ni-Cds:** it can be expensive to replace alkaline cells every time your transmitter's power runs low. Rechargeable Ni-Cd radio packs are more economical.

• **Plug-in RF (radio frequency) module:** most radios are either 75 or 27 band, requiring you to pick a band and stick with it. A removable RF module allows you to switch between 27 and 75 band by swapping modules.

• **Steering dual rate:** allows servo throw to be adjusted without affecting total available servo throw.

• **Subtrim:** a fine adjustment for precisely centering the servo; it's associated with "throttle" or "steering" to indicate which channel is being adjusted.

• **User-assigned controls:** the digital trim levers or buttons of some computer radios may be assigned different functions to suit your needs; for instance, the key assigned at the factory to dual-rate adjustment may be reassigned to operate the brake trim.

• **Wheel tension:** a mechanical adjustment of the force required to operate the steering wheel.

Dialing in your new radio

If you're moving up from a basic AM radio whose only features are trim knobs and servo-reversing, you might find yourself wondering what to adjust first when you install your new FM gear, particularly when it comes to the steering setup. Here's how to get your car's front end dialed in, step by step:

1. Servo installation: for maximum adjustability, install your servo so the output arm is as close to center as possible, with the radio's steering trim at zero. You don't want to have to eat up the radio's trimming capability just to compensate for a sloppy servo installation.

2. Trim for straight running: use the trim levers or dials to precisely center the steering servo if it is not already perfectly set. If you find that dead center is "between clicks," use the sub-trim (if available) to set dead center. The wheels should now point straight ahead; if they don't, adjust the steering linkages for straight running with the servo arm centered.

3. Set endpoints: swing the steering wheel from lock to lock and note the servo's movement. You'll probably find that the steering knuckles will reach their stops before the servo is out of travel, and this will cause the servo to buzz or growl as it strains. Not good! Use the EPA (or ATV on Futaba radios) to adjust the servo throw so the steering knuckles reach their stops but do not bind against them. Some radios permit the left and right endpoints to be set independently for precise left and right throw adjustment.

4. Set dual rate: your radio is now set for maximum steering throw, but on a typical track, you probably won't need all that steering. Steering dual rate limits left and right servo travel but does not change the endpoints at maximum throw. To set dual rate, dial out steering until you have enough to negotiate the track's tightest turns, but no more.

5. Set exponential: you may not need to use steering expo at all, but it can be handy for changing the "feel" of your car. This issue's installment of "R/C Doctor" has lots of good tips on expo, but in general, a negative expo value will make the car feel less darty and make it easier to keep straight, while a positive expo value will make the car feel like it enters turns more aggressively. Experiment.

JR RACING XR3

We've been seeing a lot of XR2s at the track, so the XR3 should be a natural. Three-channel operation and 3-model memory make a versatile transmitter, and JR's direct-access digital-trim switches automatically switch the LCD screen to show the trim value when operated. Overall feel is good, but some of us thought that the square-ish grips weren't as comfortable as other transmitters'. Sorry, lefties; the XR3 is for right-handed folks only.

HITS

- Low price; the XR3 is the least expensive digital FM radio.

MISSES

- Membrane keypad has less positive feel than button-type controls.



KO PROPO EX-11 Presto

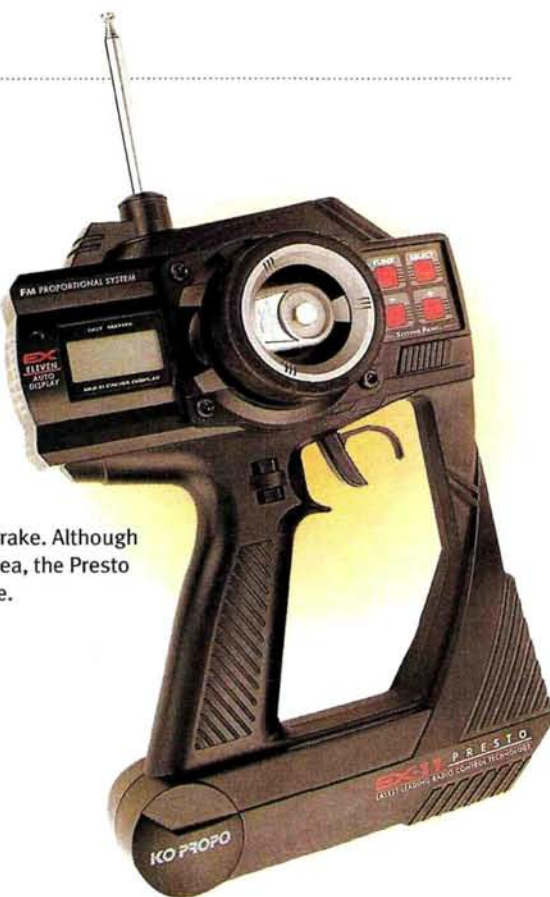
KO packs a lot into the Presto's chunky case, including anti-lock braking and 4-channel operation. "Traction control" is also offered, but it's just KO's name for negative throttle expo; in a similar vein, the Presto's "steering-response system" is simply steering-exponential adjustment. Like the Futaba 3PDF, the Presto allows throttle-channel exponential to be adjusted independently for forward and brake. Although its unique looks aren't everyone's cup of tea, the Presto is comfortable to hold and easy to operate.

HITS

- Functional anti-lock braking system.
- Independent forward and brake expo.

MISSES

- Does not include servos.
- Unique looks are not for everyone.



(Continued on page 114)

BUDGET FM RADIO GUIDE

(Continued from page 112)



FEATURES AT A GLANCE	Airtronics	Futaba	Hitec	Hitec	JR Racing	KO Propo
	CX2P	3PDF	Lynx FM	Lynx 3D	XR3	EX-11 Presto
ABS	-	-	-	■	-	■
Steering EPA	■	■	■	■	■	■
Throttle EPA	■	■	■	■	■	■
Steering expo	■	■	-	■	-	■
Throttle expo	■	■	-	■	-	■
Steering dual-rate	■	■	■	■	■	■
Model memory	-	3	-	10	3	3
Battery alarm	■	■	-	■	■	■
Channels	2	3	2	3	3	4*
User-assigned controls	-	■	-	-	■	■
Left-hand adaptable	■	-	-	■	-	-
Wheel tension	■	-	-	■	-	-
Warranty	1 year	1 year	1 year	1 year	1 year	1 year
Subtrim	■	-	-	-	■	-
Plug-in RF module	■	-	-	■	-	-
Ni-Cds	optional	-	-	■	-	-
Weight w/batteries	26.5 oz.	22 oz.	22.8 oz.	19.2 oz.	NA	21.3 oz.
Receiver weight	1.01 oz.	0.72 oz.	0.9 oz.	0.75 oz.	.88 oz.	0.6 oz.
List price*	\$315.95	\$349.95	\$169.95*	399.99*	\$209.95	\$249.99*
Street price [©]	\$199	\$220	\$94.99	\$220 (est.)	\$159	\$210

* Price includes 2 "standard" servos unless otherwise noted.

* Included receiver is for 2-channel use; may be expanded to 4 channels with extra channel unit, sold separately.

♦ Includes one standard servo.

* Transmitter and receiver only.

© Prices vary with location.

The addresses of the companies featured in this Radio Guide are listed alphabetically in the Index of Manufacturers on page 225.

BSR

Racing



THE FAST KEEP GETTING FASTER!

PATRIOT



BSR'S New Touring tires have been sweeping the touring class by storm by breaking track records all over the country! After dominating the oval scene, BSR is now ready to give the sedan competition a lesson in tire technology. BSR'S Touring Tires are available in 4 compounds, including red (soft), green (med-soft), blue (med) and gold (hard). These new special compounds are both sticky and long-lasting.



BSR'S PATRIOT Motors deliver plenty of off the line punch, ensuring the most torque and highest efficiency possible. Each Patriot Motor is custom tuned for maximum horse power for serious competition. BSR'S patriot line includes stock, rebuildable stock and modified motors. Each motor is hand built using the newest 3.5 EPIC canne and can be wound in all popular winds with XCM technology (Xtreme circular Mill).



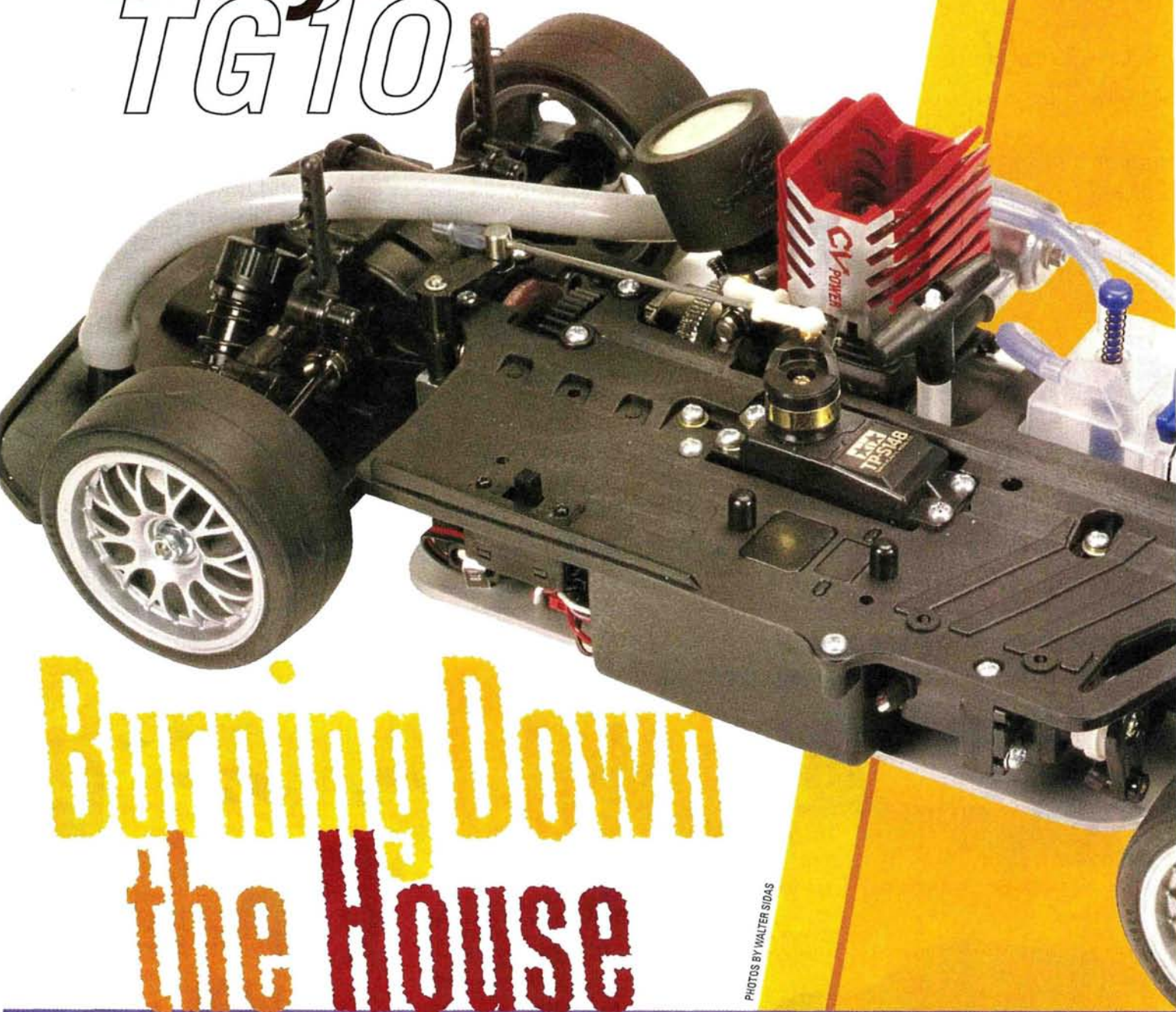
"The fast keep getting faster!...that is what the competition is saying about BSR'S tires. BSR is the leader in tire technology. BSR Radial tire are available in 7 compounds. BSR Foam tires are available in 9 compounds. New exclusive technology ensure no seam-splitting. All BSR'S Radial & Foam Tires are mounted on our new 2001 NAS Wheel, lightest and strongest wheel in today's market.

World Wide R/C MFG. Inc. dba BSR Racing / www.bsr-racing.com
109 County Road 455, Killen, AL 35645- phone: (256) 757-1564 / Fax: (256) 757-1574

FIRST LOOK!

Tamiya TG10

by George M. Gonzalez



PHOTOS BY WALTER SIDAS

We showed you a prototype of Tamiya's highly anticipated TG10 Mk.1 1/10-scale nitro-powered touring car in the December 1998 issue, and judging from the positive responses we received, this car should be a popular one right out of the gate. The TG10 shown on these pages is in full production trim and should be available at a hobby shop near you. Since Tamiya provided a ready-to-run production car, we decided to pull out all the stops and deliver an expanded "First Look" complete with a performance evaluation. Enjoy.*



PERFORMANCE

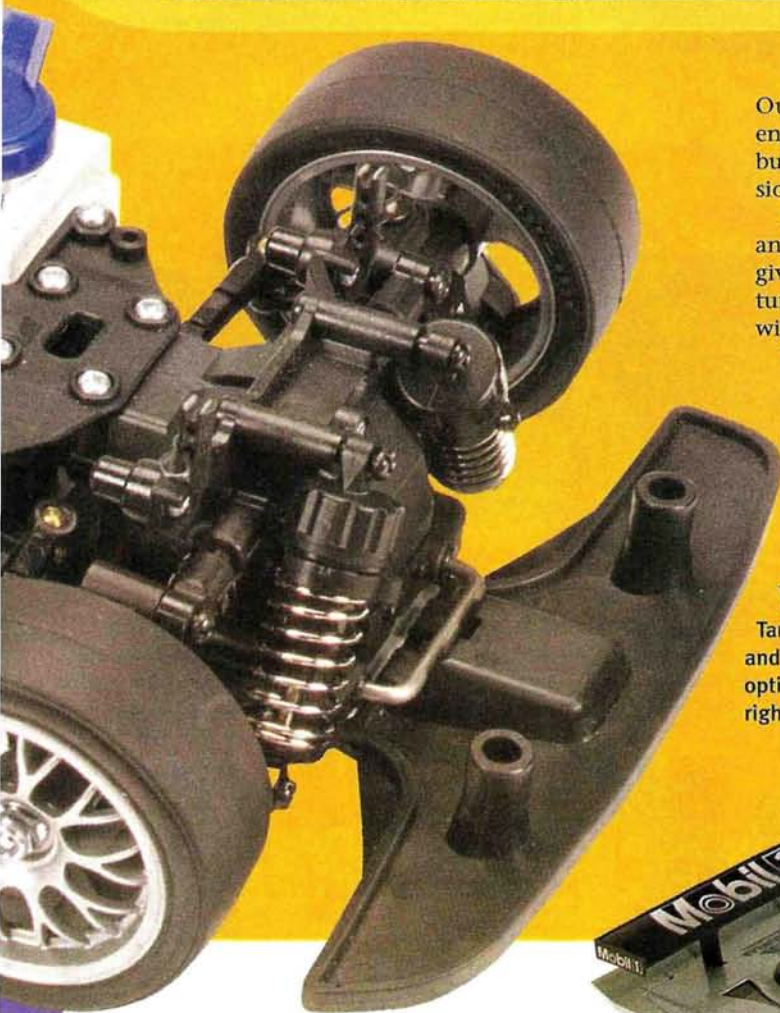
Our TG10 was equipped with an O.S.* CV pull-start engine, tuned springs, Super Slicks and full ball bearings, but the car retained the stock muffler and exhaust extension tube, which kept the noise level down.

I was quite pleased with the TG10's quick acceleration and impressive top speed. I'm confident the TG10 will give any electric touring car equipped with a 16- or 17-turn modified motor a serious run for the money, even with the stock canister muffler.

The car exhibited some on-power push that was easily overcome with some creative braking. At the track, the car was almost impossible to overdrive and tracked smoothly and accurately through the chicanes and washboard sections. The gearing seemed well suited to the tight roadcourse, as I was able to use every bit of speed down the back straightaway.

YOU'RE SUSPENDED

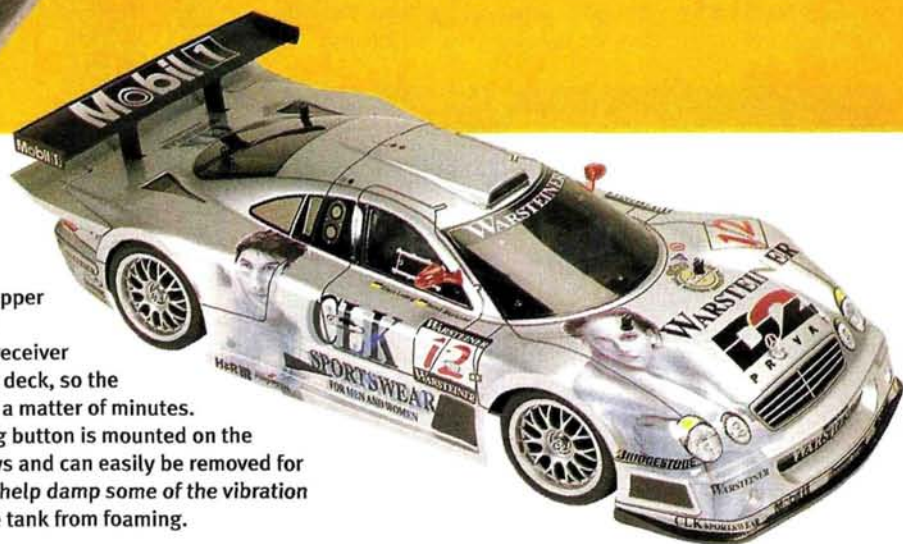
Tamiya's plastic CVA shocks provide the damping and ensure excellent maneuverability. Tamiya's optional Super Low Friction dampers may be bolted right on without modification.



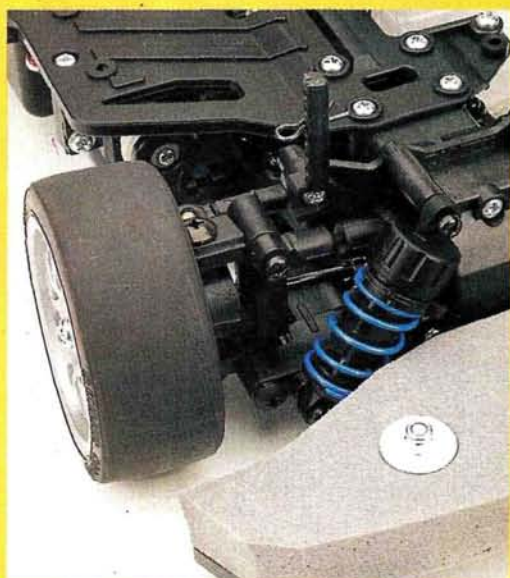
LOADED DECK

The TG10's fiberglass-reinforced, composite upper deck is easily removed for maintenance and cleanup. Both servos, the receiver and the receiver battery pack are all mounted on the upper deck, so the car can be stripped to a rolling chassis in a matter of minutes.

The 65cc quick-fill fuel tank with priming button is mounted on the upper deck with two self-tapping screws and can easily be removed for chassis maintenance. Rubber O-rings help damp some of the vibration and that helps prevent the fuel in the tank from foaming.



FIRST LOOK!



STRONG ARM

The TG10 features front and rear A-arm suspension with threaded upper links that allow camber adjustments. Optional stabilizer bars are available to help reduce body roll, and long rear wheel axles are standard and provide a wider rear track that helps keep the rear tires planted when the car is cornering.

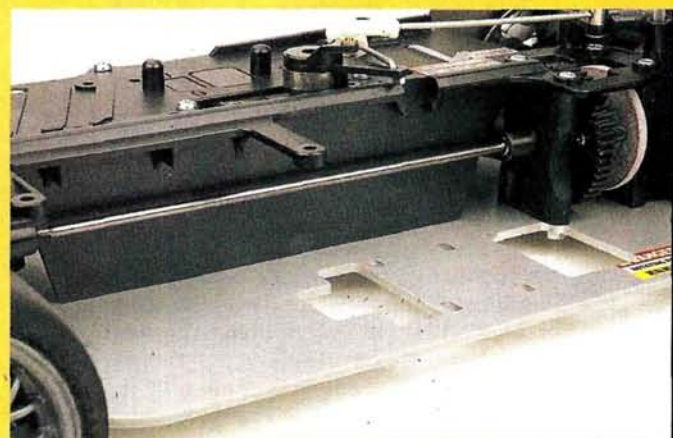
UNIVERSAL APPEAL

A new universal body-mount system allows the installation of most of Tamiya's touring and WSC bodies. You will, however, need to make openings in the body to allow air to circulate around the engine for proper cooling.



FINISHING TOUCHES

The first TG10s will include either a sleek Mercedes CLK-GTR body or a hot-looking Raybrig NSX body shown here. Racing slicks with foam inserts are included with the kit, but any standard-width touring-car tires will fit directly onto the one-piece wheels.



TALKIN' 'BOUT SHAFT

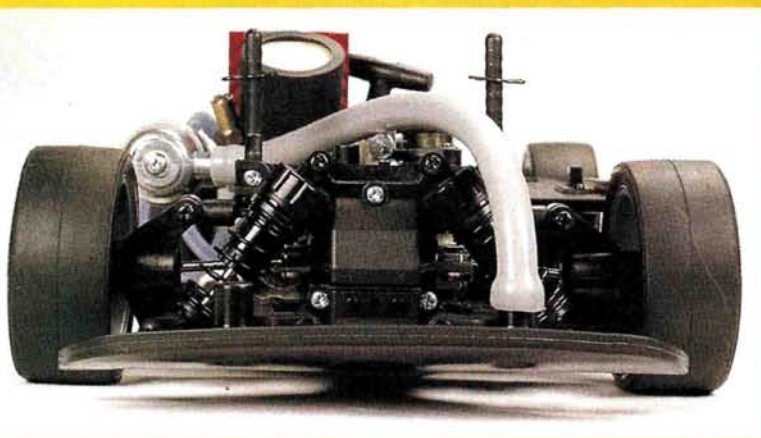
The TG10 uses an extremely efficient shaft-drive 4WD system just like the one on the company's larger TGX model. The shaft will not wear out, stretch, or be damaged by pebbles or dirt, and that gives it an advantage over the more common belt-drive systems. The brake system is incorporated in the shaft drive and includes a fiberglass brake disk with metal pads.

The drive shaft spins front and rear bevel-gear differentials that are easily accessed by removing three screws. Optional ball diffs greatly improve performance and are available from Tamiya.

FINAL THOUGHTS

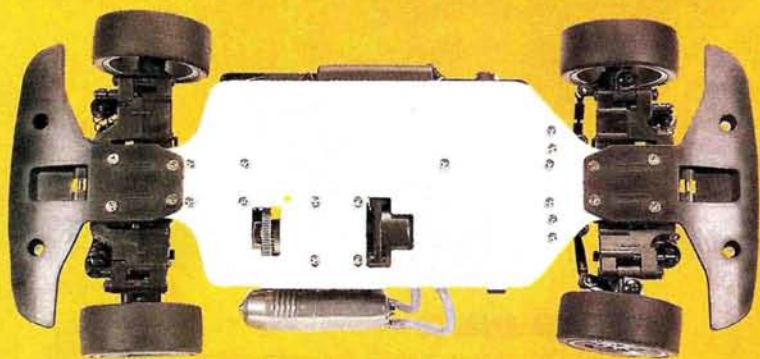
Overall, I am very impressed with the TG10's performance, and I like the fact that the car is easy to tune and maintain. Many believe that Tamiya's entry into this class will help further popularize nitro touring-car racing, but only time will tell. I can say this much, however: Tamiya vehicles have always been true to scale in both appearance and performance, but the sound and smell of nitro power add a whole new dimension to the driving experience. You can't get any more realistic than this unless you strap yourself into the cockpit of a real Mercedes CLK and peg the throttle.

**Addresses are listed alphabetically in the Index of Manufacturers on page 225.*



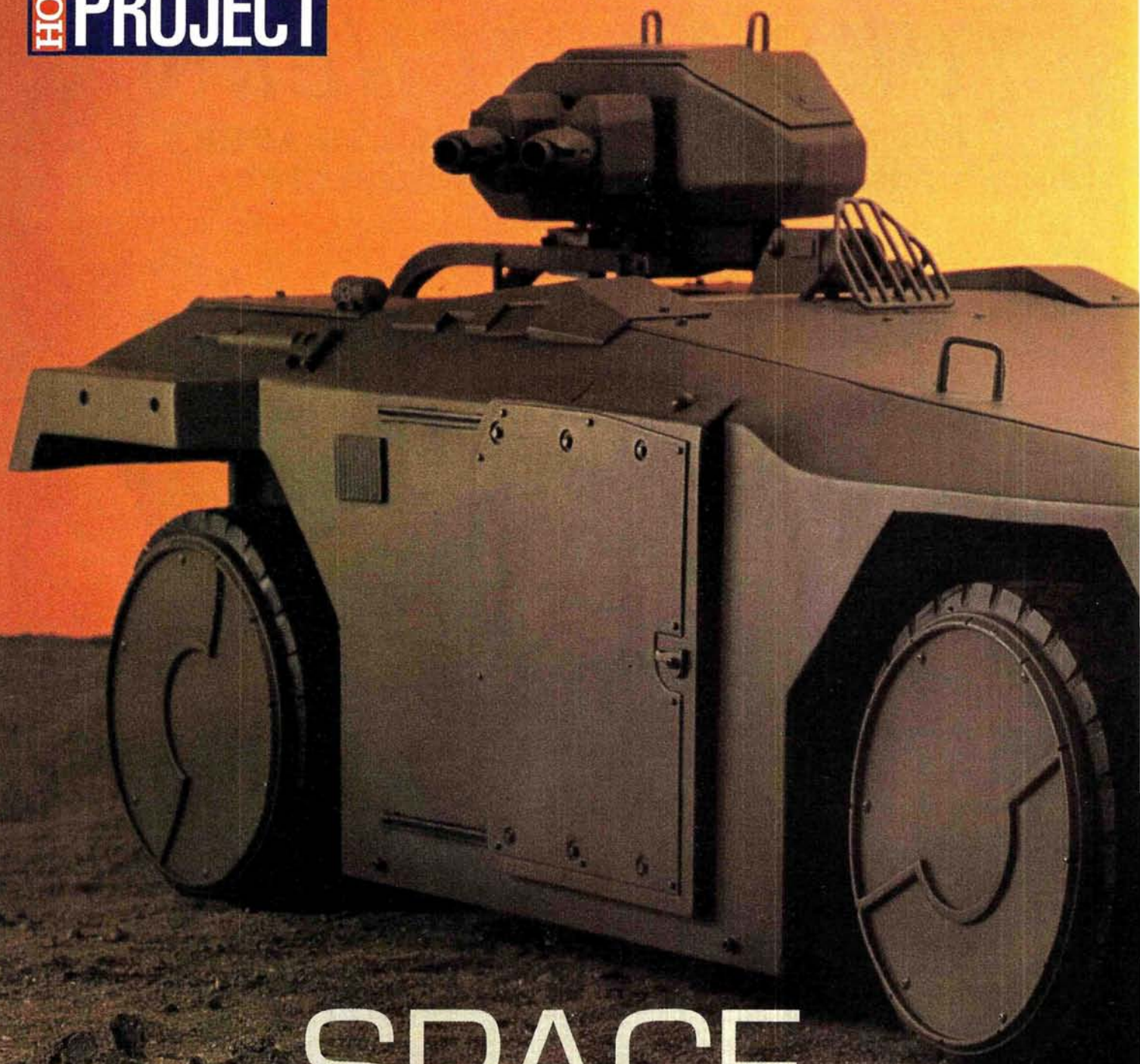
IN THE PIPELINE

Although the kit does not include an engine, a cool 24mm foam air filter is provided. A model-airplane-type canister muffler with a power-robbing silicone exhaust extension pipe are also included; Tamiya's optional tuned pipe and header are highly recommended for the best performance.



SLAB FOUNDATION

The TG10 features an ultra-rigid 2.5mm duralumin main chassis that is also an effective engine heat sink. The screw holes on the bottom of the chassis are not countersunk, but the large front and rear bumpers act as skid plates and prevent the screw heads from scraping the ground. Just about any .12- to .15-size side exhaust engine may be bolted onto the engine mounts, including the O.S. .12 laydown (with slight chassis modification). The TG10 is Tamiya's first nitro-powered car to be offered without an engine.

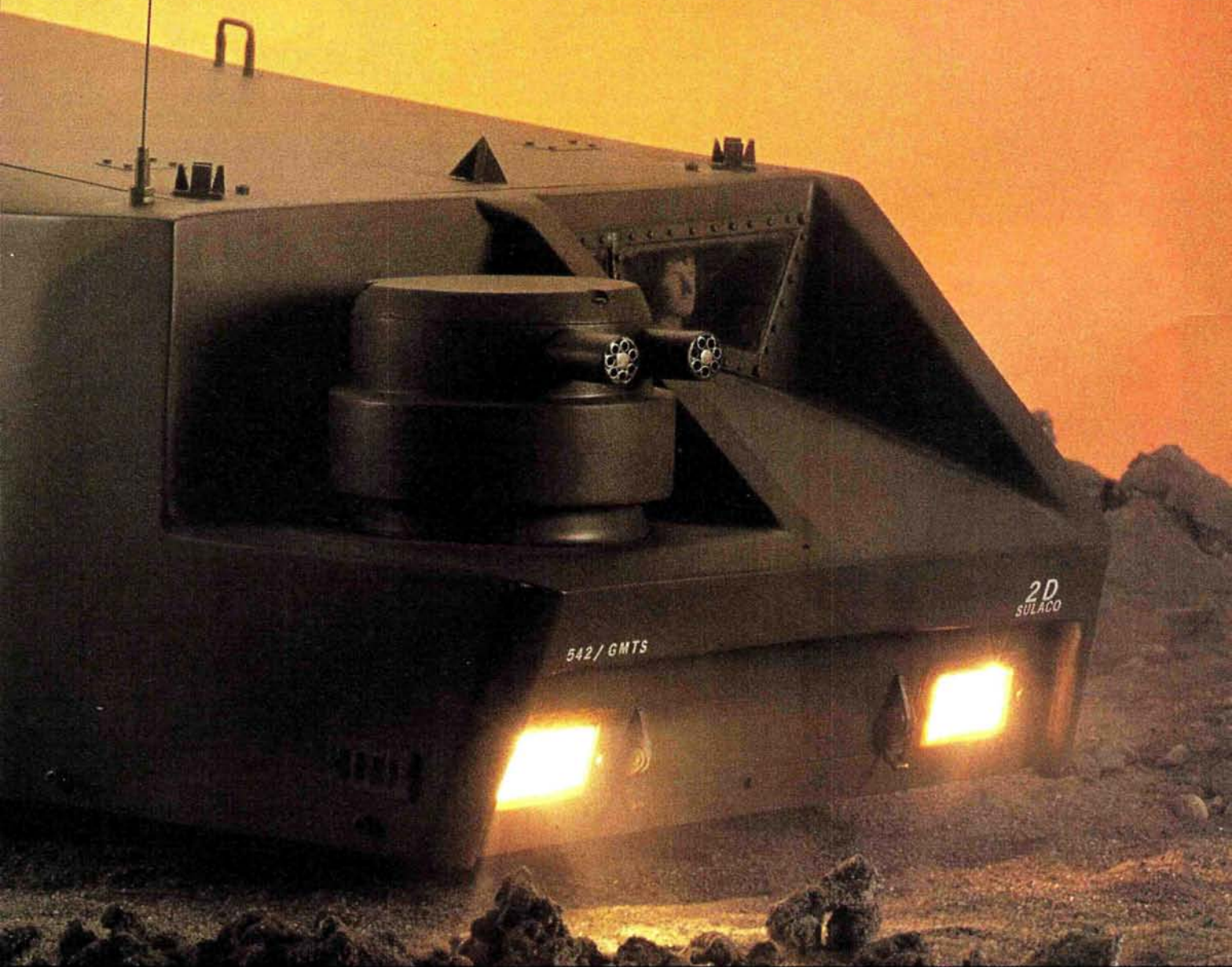


COLONIAL SPACE MARINES APC

by Peter Vieira

The killer Corvette from Clint Eastwood's "The Dead Pool" is probably moviedom's most recognized R/C vehicle, if only because it was an R/C car playing the role of an R/C car. In reality, many of the vehicles we see crashing and exploding across movie screens are actually R/C models—especially if the vehicle in question is a fantasy machine like this month's homebuilt, the armored personnel carrier (APC) from James Cameron's 1986 sci-fi classic, "Aliens." Builder Robert Haverfield of Denver, CO, demonstrates his love of modeling and science fiction with his faithfully rendered, highly detailed and quite functional machine. Let's take a closer look.

ALLEN ARMOR

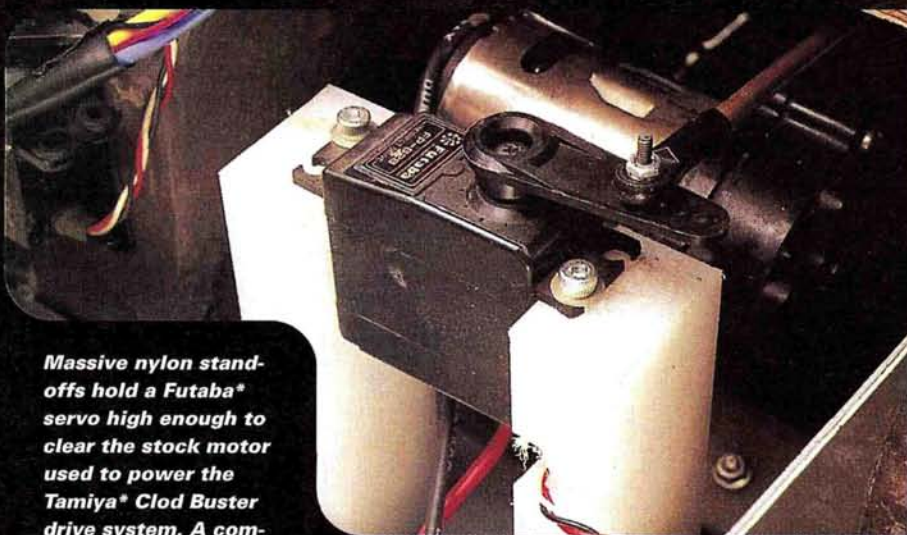


Headlights blazing, the APC looks ready to storm the atmosphere processor. Features operated by R/C include the headlights, the side marker lights and taillights and the gun on the vehicle's nose. The APC body is constructed of fiberglass cloth finished with Duraglass, much like a boat hull, while the main chassis is an 1/8-inch-thick slab of G-10 composite. Various bits of plastic stock, brass tube and wire were used to construct the many detail pieces on the APC's body. The lawnmower wheels(!) at each corner feature scale wheel covers that Robert cast in Alumilite, a machinable epoxy.

HOME BUILT PROJECT



Here's the coolest part of the APC: the functional track gun system. No wires connect the track gun to the APC; instead, the gear-reduction unit that moves the gun draws its power directly from the rails like an electric train. Robert's work here is flawless; the gun tracks up and down smoothly, and the mechanism is very solid.



Massive nylon stand-offs hold a Futaba® servo high enough to clear the stock motor used to power the Tamiya® Clod Buster drive system. A complete Clod drive axle with

its own steering servo is fitted to each end. This enables the APC to turn tightly with 4-wheel steering, "crab" left and right and maneuver with conventional front-wheel steering. The APC is surprisingly quick for its considerable bulk.

The APC features a removeable interior module, complete with padded seats and stowed sentry guns (you can see 'em in action on the laser disk version of "Aliens"). The screens above the sentry gun cases actually flicker with medical readouts and "helmet cam" images of ill-fated space marines. The images were snipped from a 16mm print from the preview for the film. In constructing the interior, Robert discovered that the APC is dimensionally "impossible"; the film set that depicted the interior of the craft simply cannot fit into the shape of the APC, no matter how it is scaled! That's movie magic for you.



The track gun has its own power supply and R/C system to control its swivel mechanism and the cannon's muzzle strobes. A microswitch fixed directly onto a Futaba miniservo activates the strobes and the accompanying sound system, while a Futaba sail-winch servo turns the track gun 180 degrees. A Dynamite® Micro Pro receiver is also squeezed in, and a Tamiya flasher unit causes LEDs in the muzzle to strobe and produce a machine-gun effect.





Two radios are required to operate the APC's many functions. (1) selects "crab" or opposed steering; (2) steering mix; (3) horn; (4) forward and reverse; (5) front-wheel steering; (6) front gun rotation; (7) track gun

up/down; (8) 4-wheel steering. A modified Tamiya two-stick controller operates the track gun; Robert replaced one of the gimbals with a rotary knob (9) to control the gun's swivel action. The remaining stick (10) activates the muzzle strobes and sound effects.

Here's the keypad for the JEM expander unit that is fixed to the back of the Futaba 7-channel controller. The unit controls the headlights (key 1), sidelights (2), rear lights (3), interior lights and engine sound (4). The RAM*



sound system raises and lowers its "rpm" to match the speed of the APC, and dual speakers cause the body to resonate with sound—very realistic.

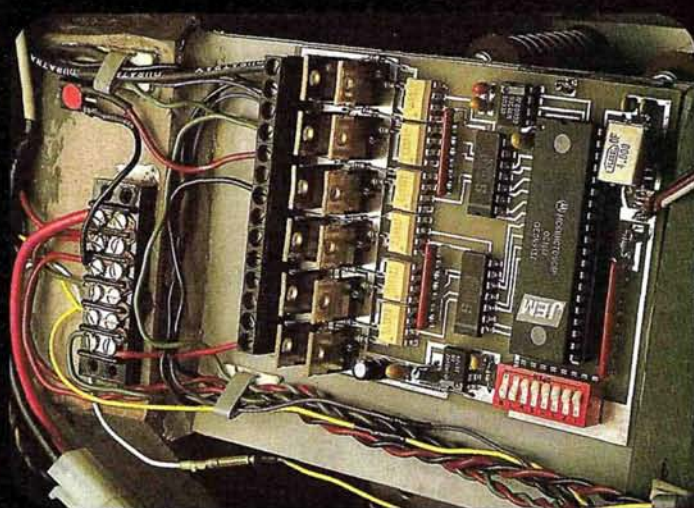
SPECIFICATIONS

Length	34 in.
Width	13 in.
Wheelbase	18.5 in.
Weight	32 lb.
Drive train	4WD; Tamiya Clod Buster gearboxes
Motors	2, 540 type
Wheels	6-in. lawnmower type
ESC	Novak Rooster
Construction time	Approx. 6 months
Estimated value	"I was offered \$5000, and I turned it down."

MATERIALS

- 4x8-foot sheet of 1/8-inch thick G-10 composite (fiberglass)
- 2 Tamiya Clod Buster drive assemblies
- Clod Buster bearing set
- Futaba 7-channel surface radio
- JEM 12-channel expander
- Novak Rooster ESC
- 7 Futaba servos
- 4000mAh 6V Ni-Cd
- 2, 1500mAh 7.2V Ni-Cds
- Dynamite Micro Pro receiver
- Modified Tamiya 2-channel radio
- 2 Tamiya flasher units
- Wiper-type speed control
- 2 Deans antennas
- 4, 6-inch lawnmower wheels
- 2 Ni-Cd receiver packs
- RAM sound unit
- 2, 3-inch speakers

■ "A lot of wire, screws, nuts, brass, plastic, etc. and a lot of time. Just ask my wife!"
—Robert Haverfield



To accommodate the APC's many R/C functions, Robert installed a JEM* 12-channel expander unit that's typically used in scale boat projects. The dip-switches are used to program each channel for momentary function ("on" as long as the keypad transmitter button is held down) or push on/push off operation.

Three switches power up the APC's systems and are hidden beneath a hatch, and a charger plug allows the receiver pack to be juiced up. Robert made tiny, brass swivel fasteners to secure the hatch and disguised them as scale bolt heads



Robert's handiwork is even more impressive when you consider that he had no plans or blueprints to follow; all he had to go on were a few stills and whatever he could glean from watching the movie. Despite his lack of research materials, the finished APC looks true to scale and is beautifully constructed. Moreover, it works and is quite rugged; there's nothing flimsy about this model! We commend Robert on a job well done and look forward to seeing his future (and futuristic) projects.

*Addresses are listed alphabetically in the Index of Manufacturers on page 225.

RACER

news

sponsored by

MIP

Race With US

by George M. Gonzalez

GET UP TO SPEED WITH ...

- 137** INNOVATOR AT WORK • Rob Robinson from Robinson Racing
- 138** SPEED SHOP • Penguin R/C's Yokomo YR4-M2/M Quad Slot battery plate; Trinity's Street Weapon 64-pitch gear adapter; Tobee Craft's lightweight TA03 driveline hardware
- 139** RACER PROFILE • Team Trinity factory driver Joel Johnson
- 140** FROM THE WINNERS' CIRCLE • A look at the winning cars from the Reedy Touring Car Race of Champions: Brent Wallace's Invitational Class-winning Yokomo YR4-M2 Pro and Jeff Whitman's Open Class-winning Schumacher SST 2000 '98
- 142** RACER TIP OF THE MONTH • Tamiya factory pilot David Jun
- 144** MINI RACE COVERAGE • Tamiya TCS National Championships

Robinson Racing Products (RRP), in business for well over a decade, has developed a reputation for manufacturing high-quality pinion and spur gears designed to meet the needs of racers of all skill levels. RRP is also well known for other innovations, many of which have been incorporated into the designs of several of today's top-of-the-line racing vehicles. Rob Robinson from RRP is this month's "Innovator at Work," and we're sure you'll find his comments compelling and informative.

As a special treat, team Trinity factory driver Joel Johnson takes the podium in our "Racer Profile," so

here's your chance to find out how Joel earned the nickname "Magic." Our "Speed Shop" features cool new products from Penguin R/C and Trinity, and we also showcase some innovative new products from Tobee Craft. That's not all; you'll also find the winning cars from the First Annual Reedy Touring Car Race Of Champions in our "Winners' Circle," and we pick up the action at the Tamiya TCS Nationals in our "Mini Race Coverage." In addition, Tamiya factory driver David Jun provides the "Racer Tip of the Month," which we're sure many racers will find very useful. Enjoy.

Look in any racer's parts box, and you're sure to find 48-pitch gears, and they'll probably be from Robinson Racing Products* (RRP). In fact, we all use 48-pitch gears because they're the happy medium between 32- and 64-pitch gears. Did you know that RRP's Rob Robinson was the first to bring 48-pitch gears to R/C? Rob explains the story behind this and other RRP innovations in this month's interview.

INNOVATOR AT WORK

R/C Car Action: Perhaps we could start with some background questions for the benefit of newcomers to the hobby. When was RRP officially launched, and who were its founders? Can you also tell me about some of the events that influenced your decision to start an R/C business?

Rob Robinson: We officially opened for business in October 1986. We were selling some products trackside before that, though. My wife and I launched the business with our Syntech Shock Oil—our first product. The business took off when some big distributors picked it up.

Our first real breakthrough came when we developed the first 48-pitch machined gears for R/C cars. At the '87 Florida Off-Road Winter Nationals only two gear choices were available—32 and 64 pitch. I liked the 32-pitch gears because they were durable, but the ratio limitations were a problem, so I switched to the 64-pitch pinion/spur combo, which was considered the "hot ticket" at the time. I stripped the gears twice during qualifying, which contributed to a "not-so-good" B-main qualifying position.

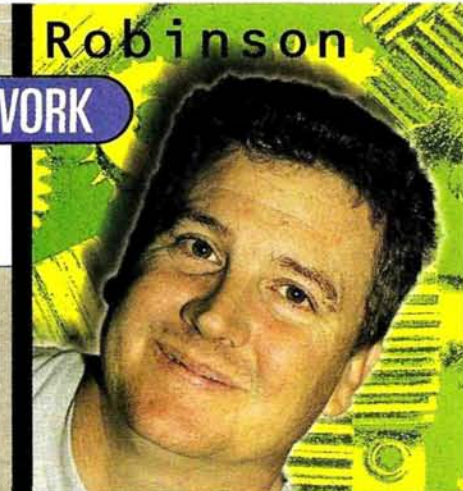
After returning home to Orange County [California], my interest was to design a gear better suited to off-road racing. I came up with 48-pitch gears because the number was smack in the middle between 32 and 64 pitch and provided a broad, yet durable, range of gears. It was very easy to calculate

the conversion from 64 pitch to 48 pitch and vice versa, and I figured the R/C industry would find it easy, too. So by introducing my 48-pitch machined gears to the R/C industry, my hobby became my full-time employer.

RCRA: Today's race-quality R/C cars are extremely sophisticated and require fewer optional and aftermarket parts to perform well in a racing environment, unlike the cars of only a few short years ago. In fact, many of today's cars include performance parts that once had to be purchased through aftermarket sources. Does the fact that today's R/C cars are more "race-ready" affect the way RRP designs new products, or do you feel that there's always room for improvement?

RR: Not everyone in this hobby can start off with a top-of-the-line racecar. So, we have an inexpensive six-pack starter kit—that's six sizes of pinion gears in one package offered at an economical price—for entry-level racers, and for the more dedicated racer, we offer hardened, precision gears. We have something for everyone. All parts eventually wear out and must be replaced, and racers want a reputable company to turn to for what they need. And, yes, I do believe that there's always room for improvement.

RCRA: RRP is well known for its high-quality line of pinion and spur gears, but the



company is becoming better known for innovative products such as its Sure Fit ball cups, Absolute spur gears, Losi and Associated high-performance slipper clutches, HPI RS4 gear adapters, and the list goes on. I guess my question is, how do you come up with all this cool stuff?

RR: I'm a hobbyist at heart. I try to think about what I would want if I was using a particular part or running a certain car. Some of my ideas come real easy, and others take some searching. Some ideas have also come about from what I thought was a mistake at the time. For example, I once was working on a design for the Associated outside slipper plate. I had the slipper plate in my lathe and accidentally drove the cutting tool to the left instead of to the right, which created an indentation in the center of the part. Figuring I had scrapped it, I took the part out and was fumbling around with it on my bench, when I put a 3/16 by 3/8 bushing inside the indentation and realized that I had improved the part. Associated has now incorporated this

Continued on next page

Continued from previous page

INNOVATOR AT WORK

improvement in its T3/B3 slipper plates, and I don't blame them; they're easier to manufacture and far superior in design. We have a lightened version of this part—part no. 1510—which comes with fixed slipper pads.

RCCA: There seems to be no end to the growth in popularity of touring cars, and that's a good thing because they attract new people to the hobby. Has the touring-car market opened up new avenues or markets at RRP?

RR: We've just released our new 64-pitch, black Absolute Spur Gear, designed around the interest in touring cars. Gears of 64 pitch are better suited to cleaner applications, such as carpet racing and on-road.

RCCA: What do you like about running your own business and working in the R/C industry in general?

RR: I have always been an independent person who enjoys working on my own ideas. It has been very rewarding to be able to turn one of my hobbies into a successful business. The only downfall to my hobby also being my job is that sometimes the job takes some of the joy from it.

RCCA: What do you like to do when you're not working?

RR: Tournament bass fishing would be on the top of my list of recreational activities right now. But, more important, spending time with my wife and three kids.

RCCA: You're an angler, huh? I'm a bass fisherman myself and consider the sport my second love (after R/C, of course). Why don't you design lures or other fishing-related accessories?

RR: Because I do not want to ruin another hobby. I've thought about manufacturing sport-fishing accessories, but then I would have two jobs and no hobbies. It's just not worth it.

RCCA: I hear you, Rob. What does the future hold for RRP? Can you tell me about some of the new products you're working on?

RR: The key to survival in the R/C industry is keeping up with all the changes. It's also important to remember the entry-level racer and his needs along with those of the pro's. With that in mind, we are developing some steel spur gears for the RC10GT. They should help those who have problems stripping the stock plastic gears.

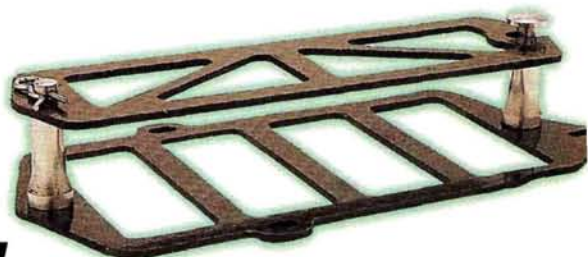
RCCA: Thanks a lot for your time, Rob. Good luck with all of your future endeavors, and keep manufacturing all those cool racing products.



Rob's second love is tournament fishing. Here he's shown with a trophy-size 10-pound largemouth bass.

Speed Shop

4x2 battery mounting for your Yokomo YR4-M2



Penguin R/C's* new Quad Slot battery plate is designed as a replacement for the Yokomo YR4-M2/M2 USA's stock three-slot battery plate that is mounted on the right side of the chassis. The Quad Slot allows racers to mount 4 cells on the right side and 2 cells on the left side for improved weight distribution, and it still keeps battery mounting user-friendly. The Quad Slot includes the lower 4-slot battery plate and an upper battery retainer and two 3x8mm flat-head screws that go into the existing Yokomo battery posts. Both plates are CNC-cut from high-quality woven carbon fiber and, once installed, retain 2.5mm of fore-and-aft adjustment. Part no. P1700; \$24.99.

Fine-pitch gearing for your Street Weapon

Trinity's* new Street Weapon 64-pitch gear adapter allows racers to run more efficient 64-pitch gears in their Losi sedans. The machined-aluminum gear adapter slides right onto the stock layshaft and is universal in design, which means aftermarket spur gears can be bolted right on. Although 64-pitch gears run smoother and offer a broader range of gear ratios, aftermarket 48-pitch spur gears can also be used for added versatility. Install a Trinity 64-pitch gear adapter in your Street Weapon, and you'll be able to choose from an unlimited variety of spur gears. Part no. TK3040; \$10.99.





TA03 lightweight driveline hardware from Tobee Craft

Tobee Craft, already well known in the Land of the Rising Sun for its innovative tuning accessories for the Tamiya TA03, is becoming known in the States through the efforts of the company's

exclusive U.S. distributor, GTP* of California. Tobee Craft makes a ton of cool products, but here are a few lightweight driveline parts that I found particularly interesting.

First, countershaft and gear sets for the TA03's front and rear gearboxes (sold separately). The countershafts are made from aluminum and have been machined to remove as much material as possible to reduce rotating weight. The countershafts come with the gears already pressed onto the shafts, and the gears are much narrower and lighter than the stock gears to further reduce rotating mass.

Tobee Craft's Lightweight Spur Gear Set is a spur-and-countergear cluster that replaces the stock counter- and spur gears. The kit's 30-tooth machined-aluminum countergear and interchangeable plastic, 0.4 module, 59-tooth spur gear are lighter than the stock gears. Spur and countergears are available in several sizes, and this allows you to alter your gearbox's final gear ratio. It also opens a new door to gearing choices for the venerable TA03.

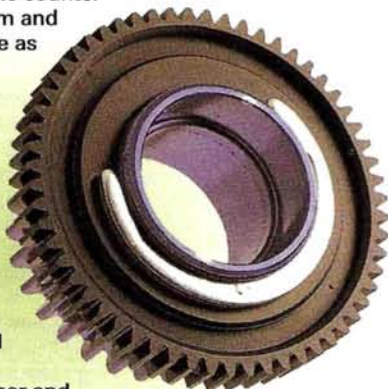
Tobee's TA03 Locked Rear Axle replaces the stock differential and provides positive traction to each rear wheel without any differential action whatsoever. The result is a loose ride that can equal faster lap times, if you have quick reflexes. Basically, the locked rear axle forces the rear end of the car to slide out during cornering, and this allows the car to get through the tightest turns quickly. The driver, however, must know when to apply the precise

amount of throttle to whip the car's rear end back into place, or the car will spin out completely. The locked diff is designed for tight roadcourses and tracks with a lot of sharp turns.

Countershaft and gear set (F/R)—part nos. 20120/20130; \$17.99/\$12.99.

Lightweight spur and countergear set (59T/30T)—20260; \$24.99.

Locked axle—20080; \$25.99.



RACER PROFILE JOEL JOHNSON



Team Trinity factory pilot Joel Johnson is arguably R/C racing's best-known driver. One of the first factory drivers to be employed as a full-time professional R/C car driver, he has won so many Worlds and national championship titles that Joel himself probably can't remember them all. Joel is also a true businessman and one of the most courteous and professional drivers to ever hold a transmitter. Here's your chance to find out a little more about one of our sport's all-time greats.

VITAL SIGNS

Age: 30

Occupation: database/Internet development engineer

Hometown: San Jose, CA

Years racing: 23

First R/C car: Jomac 1/12-scale (.049 powered)

Favorite racing class: 4-cell, 1/12-scale

Favorite track: Ranch Pit Stop

Favorite race: Cleveland Indoor Championships

Sponsors: Trinity, TRC, Novak, Team Losi and Airtronics

Major victories: '87 IFMAR Off-Road Worlds, '92 1/10 On-Road Worlds, ROAR Nationals (30 wins), Cleveland Indoor Champs (nine wins).

R/C Car Action: Thanks for this opportunity to talk with you today, Joel. You're one of R/C's most famous racers, and if I'm not mistaken, you also own more national and world championship titles than any other driver. For the record, exactly how many championships have you won?

Joel Johnson: I have won three Worlds and 30 national championships.

RCCA: Wow! How did you first discover R/C racing, and how old were you at the time?

JJ: I discovered R/C racing with my father when I was 7 years old. I was very fortunate that my family was in the hobby business, so I basically grew up in a hobby shop. I saw my first R/C car in 1974 when we lived in Hawaii. It was a Dynamic 1/18-scale gas car that was famous for falling apart. Shortly after that, we moved to San Jose, California, where my father opened his hobby shop. That was when I got my first R/C car—a Jomac 1/12-scale gas car; there were no electric cars then. By the start of 1976, my father and a couple of Silicon Valley engineers had developed an electric car, which we believe was one of the first in the country. What made this car unique then was that it featured a solid-state speed control similar to what we use today, only much larger.

RCCA: Were you a "natural," or did it take a while to develop your driving skills?

JJ: Because I started so young, it's really hard to judge, but when you have the success that I've had, natural ability has to play a part, along with good fortune.

RCCA: What was your first big race, and how well did you do?

JJ: My first national event was the 1980 ROAR Nationals in Fremont [CA]. I ran both 1/8-scale gas and 1/12-scale electric. My top finish was first or second in the B-main. I think Gary Kyes of Team Losi could probably better remember, as he was my racing mentor at the time. The 1981 Nationals was a different story: I won two of the five classes, with a second, third and fourth in all the others. I was only 13 years old.

Continued on page 146



RACER **n**ews

FROM THE WINNERS' CIRCLE



**BRENT
WALLACE**
YOKOMO YR4-
M2 PRO —
INVITATIONAL WINNER



Shortly after the IFMAR On-Road Worlds were held in England, the top touring-car racers from around the USA gathered to mix it up at the First Annual Reedy Touring Car Race of Champions held at Ripon R/C Raceway in Ripon, CA. The event consisted of two classes: Invitational and Open. The Invitational racers were professionally sponsored drivers with long histories of success. All drivers were eligible for the Open, and the top 10 A-main contestants were some of the fastest racers in the country.

Team Yokomo factory driver Brent Wallace from Fresno, CA, was extremely successful at the Reedy Race. He won the Invitational with an all-new YR4-M2 Pro that he had built the night before. Because the car was so new, neither Brent nor the rest of the Yokomo factory team had any experience with it, so each heat was a learning experience. Jeff Whitman from Ben Lomond, CA, had his Schumacher SST 2000 '98 dialed from the start and dominated the Open.

Brent and Jeff were kind enough to send us their winning rides, so we can show you the R/C products and winning setups they chose to run against a field of the best touring-car drivers in the country. The cars are set up for a permanent outdoor high-bite track, so for many of you, this information will be quite useful.

CHAMPIONSHIP WINNING PARTS

- Novak* Cyclone ESC
- Maxtec*
 - ShockWave 9-turn double motor and VTX high-voltage batteries (4x2 configuration)
 - front belt tensioner
- Futaba*
 - 3PJ transmitter and FP-R103F 3 channel FM receiver
 - 402 steering servo
- Yokomo*
 - Sprint slick tires (firm compound with medium-compound inserts) mounted on 5-spoke 1-inch Up wheels
 - rear swaybar
 - foam bumper and body mounts
 - titanium hinge pins
- Team Suzuki* 3-degree front caster blocks
- Lunsford* titanium turnbuckles
- MIP*
 - aluminum CVDs
 - BJ Balls ball joints
 - carbide diff and thrust washer rebuilt kits both front and rear
- Hangar 9* servo horn

OTHER PARTS USED

- Andy's* Stratus body
- Kimbrough* gears (87/21)
- Custom double-ply graphite rear shock tower
- Custom graphite bellcrank supports with ball bearings (servo-saver removed)

CHASSIS AND SUSPENSION SETUP

FRONT

- Caster: 5 degrees
- Camber: 1 degree
- Toe-in/out: 0 degree
- Ride height: 5mm
- Shocks
 - fluid: Yokomo 600WT
 - piston: stock
 - spring: Pico 4-coil short Green spring
 - length overall: 2.75 in.
 - mounting location: outside hole on shock tower and standard hole on the suspension arm
- Camber-rod location: inside hole on shock tower

REAR

- Camber: 1 degree
- Ride height: 5.5mm
- Shocks
 - fluid: Yokomo 500WT
 - piston: stock
 - spring: stock
 - length overall: 2.60 in.
 - mounting location: lower outside hole on shock tower and standard hole on arm
- Camber-rod location: inside hole on shock tower

RACER *n*ews

FROM THE
WINNERS'
CIRCLE

JEFF WHITMAN
SCHUMACHER
SST 2000 '98—
OPEN CLASS WINNER

CHAMPIONSHIP WINNING PARTS

- LRP * V6 ESC
- Maxtec ShockWave
11-turn single modified motor
- Pro-Match* RC-2000
matched cells
- Airtronics*
—Caliber 3PS transmitter
and FM receiver
—94737 servo
- Front and rear stock
swaybars
- Pro-Line* S3-compound
tires with Losi firm
molded inserts mounted
on black Schumacher
wheels
- Lunsford titanium turn-
buckles
- Schumacher*
—optional aluminum
motor mount (part no.
U2034N)
—optional 4mm rear drive
belt (U15270)
—universal gear adapter
(U2014P)
—modified carbon-fiber
shock towers
—stock plastic universal
drive shafts
- Schumacher adjustable
steering Ackerman
(2016T)

OTHER PARTS USED

- Andy's Stratus body
- Kimbrough gears (87/19)
- Custom battery-hold-down system

CHASSIS AND SUSPENSION SETUP

FRONT

- Caster: 5 degrees
- Camber: 2 degrees
- Toe-in/out: 0 degree
- Ride height: 5mm
- Shocks
—fluid: Associated 80WT
—piston: standard 2-hole
—spring: Schumacher yellow
—mounting location: number-
2 hole on shock tower

REAR

- Camber: 1.5 degrees
- Toe-in: 3 degrees
- Ride height: 5.5mm
- Shocks
—fluid: 80WT
—piston: standard 2-hole
—spring: Schumacher red
—mounting location: number-2 hole
on shock tower
- Anti-squat: standard setting

**RACER TIP
OF THE MONTH**

David Jun
Tamiya factory pilot

If your Tamiya vehicle that's equipped with optional stainless-steel hinge pins, starts to develop excess slop caused by wear, this tip will allow you to fix the problem without having to buy new suspension arms. Remove the hinge pins from the vehicle and clean them with a rag. Next, clean the suspension-arm mounts (where the hinge pins slide in) with a cotton swab. The next step may sound crazy, but trust me, it works. Apply a couple of drops of CA to the hinge pins and re-install the hinge pins and suspension arms on the car. Wait a few minutes for the glue to cure, then remove the hinge pins from the vehicle with pliers. All that's needed is a slight twist of the pliers because CA cannot properly bond to stainless steel. The CA will, however, bond to the suspension arms, and that means the glue will cure and fill most of the gaps that were caused by normal wear.



RACER **n**ews

"Racing the TCS way"

by George M. Gonzalez

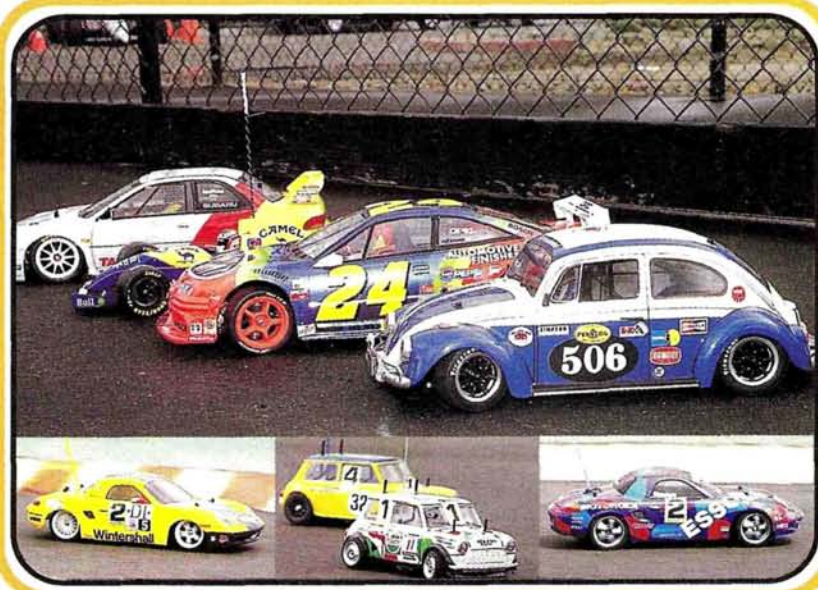
THE TAMIYA CHAMPIONSHIP Series (TCS), which throughout the year holds regional events around the country and a final national championship at the company's beautiful facility in Aliso Viejo, CA, is one of the most professional (and enjoyable) racing venues in R/C racing. The champion in each of the four sanctioned racing classes wins a trip to Japan to compete in a glorious world championship against the European and Japanese champions. But that is only a bonus because competing at any level in the Tamiya Championships is a rewarding experience. There was plenty of action at this year's Nationals, as many TCS regulars and local fast guys battled it out for a piece of Tamiya victory. Only one winner in each class would represent the United States at the Worlds, so it wasn't a surprise that the competition was extremely close.

OVERVIEW

- **4WD Sedan.** Any stock or modified motor and 2000mAh or less battery packs were legal in this class. Brent Sisley was clearly on a mission, as he piloted his TA03 to a first-place victory after doing battle for six grueling heats with Paul Lemieux and Tony Phalen. Tony Phalen had the fastest heat time with a TA03R chassis that he had borrowed from a friend.
- **FWD Sedan.** The competition was intense, as the FWD cars proved to be excellent performers with the stock 540 Mabuchi powerplants. Less than 1/100 second determined the winner, as Mike Allen and Scott Norton had almost identical times after six heats. Allen ended on top, though, and Drew Hagestad made the limelight by taking third.
- **M-Chassis.** Stock, unmodified Mabuchi motors and box-stock



Serious wrenching going here—I love those husband-and-wife racing teams.



PHOTOS BY: GEORGE M. GONZALEZ

tires kept the competition close here also. Young Raymond Flores came in first, but he had to give his ticket to Japan to second-place finisher Bob Sager because he isn't yet 18. Jesse Shapiro was third after putting in the same number of laps as the leaders.



The TCS national champions (left to right): Bruce Hickman (F1), Brent Sisley (4WD), Mike Allen (FWD) and Bob Sager (M-chassis). Next stop, Japan!

• **F1/Indy.** It's always a pleasure to watch these cars race. They're smooth, fast and precise, even when powered with the stock Mabuchi powerplants. Bruce Hickman took the championship with ease and put in two more laps than his nearest competitor, Russell Johnson. Steve Williams rounded out third.

Continued on page 146

SUPER SCALE RACING

No other racing series comes close to the TCS in terms of scale appearance. Imagine the beauty of a field of Formula 1 and Indycars circling the track with point-and-shoot accuracy. Then, in the very next heat, witness the ugliness as 10 gorgeous sedans swap paint, roll over and fly through the air in the heat of battle. After that, watch the track being overrun by a swarm of M-chassis cars; the emotions run high as the little cars muscle their way around the track. Last, throw into the mix the family emphasis and young, new racers, and you have the TCS all summed up.





RACER news

Continued from page ???

RACER PROFILE Continued from page 139

RCCA: Who were your biggest competitors back in the early days of your career?

JJ: In the early days, people like Mike Lavacot, Kent Clausen, Ralph Burch, Terry Rott and Tony Neisinger were my big competitors. It's nice to know that I'm not the only one still racing.

RCCA: In your opinion, has R/C racing changed much over the years? If so, has it changed for the better, or for the worse?

JJ: R/C racing has changed tremendously over the years due mostly to technological advancements in the motor, battery and electronics areas. Some of the changes for the better are stronger, more efficient batteries. High-frequency speed controls, which are easier on motors and batteries, have also been good for the sport. Things not good for the sport, but inevitable, are rubber technology in off-road and touring-car racing, i.e., "the tire of the week" and the lack of a strong organizing body to lead this sport into the next millennium. I feel the cost of racing is starting to become a barrier to many, and I think the organizing bodies need to look into their past to get some ideas for the future. We had some good direction in the early '90s, but unfortunately, that was squashed.

RCCA: What is your fondest R/C memory?

JJ: My fondest R/C memories have nothing to do with R/C cars but came from pitting for my father when he won his first North American Model Boat Association [NAMBA] national championship a few years ago. This was special for me because my father has been racing model boats for 35 years, and was one of the founders of NAMBA, but had never won an individual national championship. After the race, he told me, "Maybe I could finally be known as Gary Johnson instead of Joel Johnson's father." My dad has a great sense of humor!

RCCA: How did you get the nickname "Magic"?

JJ: I got the nickname after the 1985 Nationals at the Ranch Pit Stop. I had a great race and *Competition Plus* magazine dubbed me "R/C racing's Magic Johnson," since Earvin Johnson had just started for the NBA.

RCCA: Who do you consider to be your toughest competitors in 1/12, 1/10 and touring car?

JJ: My toughest competitors are basically the same in all three classes: Josh Cyrul, Mike Blackstock, Jon Orr, Barry Baker, Mike Swauger and, of course, Masami Hirotsuka and David Spashett, when I see them.

RCCA: What do you like to do when you're not racing or working? Do you have time for hobbies?

JJ: I like to mountain bike, which is great here in Northern California, and I also like to spend time with my wife on weekend getaways whenever we can.

RCCA: Last time we spoke, which was about two years ago, you mentioned that you were back in school. How's that coming along?

JJ: I finished my BS in Management Information Systems in May '98 after many long years full of R/C breaks.

RCCA: Trinity owner Ernie Provetti's story about you winning the '84 All Japan Championships, which ultimately launched the company and your racing career, will always be one of my favorites [April '98 "Racer News"]. Do you recall how you felt that day when you were racing against the best drivers in Japan and knew that the future of Trinity would be determined in the minutes to follow?

JJ: That was a great trip for Trinity and quite an experience. I really didn't get the sense that Trinity's future was riding on my coattails, as Ernie did a great job of explaining that we had to win, but that it wasn't a life-and-death situation. In fact, every race we went to was directly related to sales, so the pressure was really no greater than at the Nationals over here. Anyone who has ever raced for Ernie knows that if he can't deal well with pressure, then he's on the wrong team.

RCCA: How has your relationship with Trinity matured over the years? And what are some of your responsibilities with the company?

JJ: Well, the relationship has matured from a pure racer relationship to my involvement with new product development and also as a pseudo team leader at races in Ernie's absence. I'm learning to deal with the political side of racing that I really shunned in my younger years. I'm definitely forming an opinion of how I think things should be done.

RCCA: How would you rate your performance at the '98 IFMAR On-Road Worlds in England?

JJ: I felt that my performance at the Worlds was ... well, average. The only class I had a real shot at winning was the Touring Car class, and unfortunately, my luck didn't hold, as I had some mechanical problems in heats that might have afforded me the individual championship. While I enjoy running 4-cell 1/12-scale on carpet, I'm more comfortable on asphalt with 1/10-scale, 6-cell 1/12-scale and touring cars.

RCCA: You looked dialed at the Worlds, but your teammate, David Spashett, was clearly on rails in all three events. Did the fact that you're both on the same team influence the way that you competed against each other at the Worlds? In other words, would you have challenged Spashett if the opportunities were there for the taking?

JJ: I competed against David with the same tenacity as I would any competitor. The only difference would be if we were racing head to head; I would not take any chances to jeopardize the win for Trinity. It is always a tough situation to race your teammate for the win, and it takes real maturity to know when it is not your turn to win.

RCCA: What does the future hold for the "Magic" man?

JJ: The future holds a house, a family, a new career and much more R/C racing. Who knows? Maybe the last two will be combined in the near future.

RCCA: It's always a pleasure to talk to you, Joel. I wish you continued success in racing and in your career with Trinity.

WINNERS

FIN.	DRIVER
1	Mike Allen
2	Scott Norton
3	Drew Hagestad
4	David Anderson
5	David Beale
6	Jones Kim
7	Jose Morales
8	Hank Shie
9	Ray Paley
10	Johnny Pun
FIN.	DRIVER
1	Raymond Flores
2	Bob Sager
3	Jesse Shapiro
4	Miguel Macais
5	Thad Garner
6	Ken Vanwyk
7	John Brown
8	Sean Williams
9	Scott Mente
10	Antony Querol
FIN.	DRIVER
1	Bruce Hickman
2	Russel Johnson
3	Steve Williams
4	Marty Hageman
5	Lee Passehl
6	Chien Hwa Chen
7	Mathew McDonough
8	Neal Sartor
9	Chris Osmond
10	Anthony Fung
FIN.	DRIVER
1	Brett Sisley
2	Paul Lemieux
3	Tony Phalen
4	Eric Bruner
5	Jeff Stevens
6	Derek Hung
7	Pat Manalo
8	Wen-Ping Chiang
9	David Weir
10	Brian Cianfrone

FINAL THOUGHTS

The Tamiya Nationals, as always, was an absolute spectacle. Scale-looking cars, close competition and a family environment make the TCS a successful racing venue. Congratulations to all the winners, and we wish them luck at the Worlds. Thanks to Tamiya for supporting such a great racing program and to all the contestants who made the trek to sunny Southern California.

*Addresses are listed alphabetically in the Index of Manufacturers on page 225.



Pro-Line and R/C Car Action

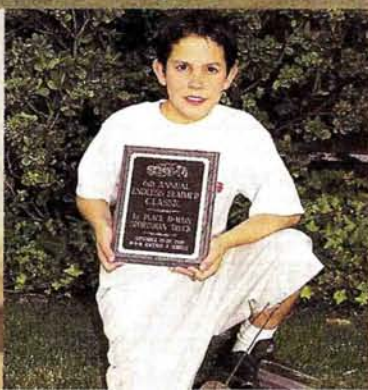
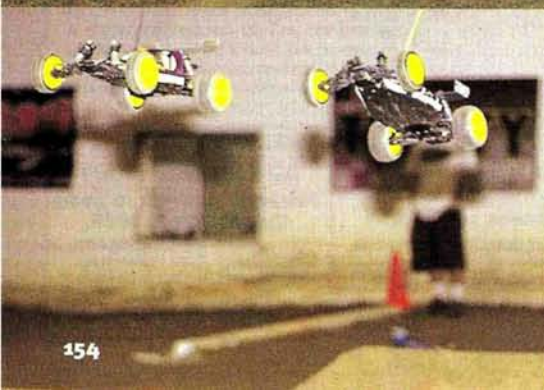
Endless Summer Classic

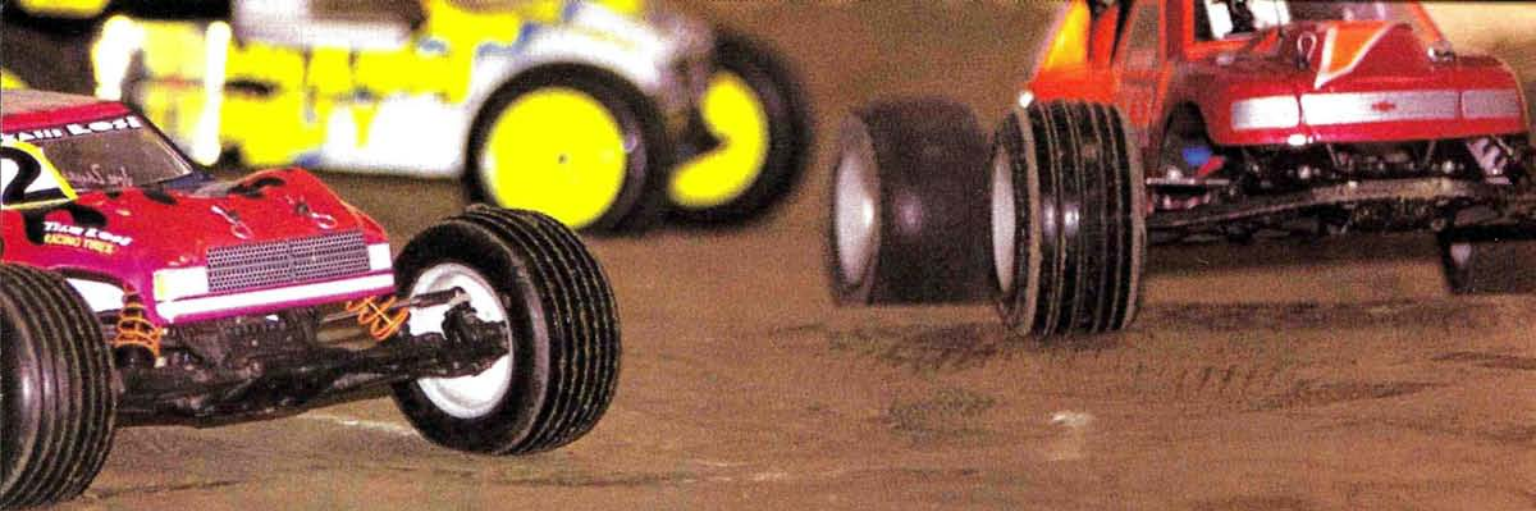
by George M. Gonzalez

Hmm What should I do on the last weekend of summer? I know, I'll go R/C racing! That was the plan of 250 racers who flocked to M n M Hobbies in Corona, CA, to attend the Pro-Line and R/C Car Action Endless Summer Classic, which is held every year on the last weekend of summer.

The Endless Summer Classic may not be a sanctioned event with national championship titles hanging in the balance, but it is one of the most well-attended races of the season. It's also one of the few large races dedicated to the sportsman and expert drivers who primarily race for fun. Of course, many well-known sponsored drivers were also there, and they set the stage as well as the TQ pace.

Eleven-year-old Ben Chaloupka from Camarillo, CA, was the youngest racer at the Endless Summer Classic. Ben has been racing for two years and has already had his share of victories at Ventura County Roadrunners.





PHOTOS BY GEORGE M. GONZALEZ

R/C racing from one season to the next

Dana Timm from Riverside, CA, found a new use for Pro-Line foam tire inserts. They make a great pair of earmuffs, but Dana admits that they itch a little.



QUALIFYING AND A-MAIN OVERVIEW

• **2WD Stock.** Top qualifier David Mangelsdorf from Ontario, CA, drove his Trinity-powered Team Losi Double-X on the ragged edge during all three rounds of qualifying. He beat his rival, Andy Smolnik, who was driving a Reedy-powered Team Associated RC10B3. Joey Stanovich, Charlie Albrecht and Travis Amezcua looked pretty dialed during qualifying as well, and they all finished on the same lap and less than 3 seconds behind the leaders.

After a clean start in the A-main, it was TQ Mangelsdorf who shot out in front, with Smolnik, Stanovich and Josh Anderson in tow. The only change in the order came when Stanovich swiped the third-place spot from Anderson; the drivers finished in almost the same order as they had started.

• **Stock Truck.** Charlie Albrecht's Peak Performance-powered Losi Double-XT was clearly the truck to beat during qualifying. Albrecht was the only driver to turn in solid 11-lap runs in all three of his qualifiers. Brian Winberry, who was driving a Reedy-powered Associated T3, finally got it together in the third round to steal the second qualifying spot away from Michael Philip, who was bumped to third.

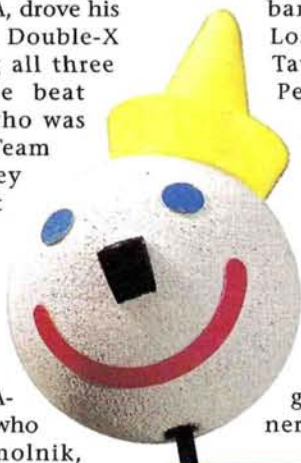
As always, I video-tape the Main events so I can describe the action when I write the story. After viewing the video, however, I still can't describe what went on during the Main because of all the hacking that took place. All I know is that Brent Bisbee came from nowhere to take the victory. While Philip took second and Jeremy Amar, who had qualified in seventh, claimed third.

• **2WD Modified.** Team Trinity/Team Losi factory driver Brian Kinwald was the only driver in this class to turn in a 12-lap run during qualifying, and he did it two times out of three. If his teammate Chad Phillips had made it around the last corner a micro-second faster in the second round, he, too, might have posted a 12-lap run. Phillips ended up posting 11 laps in 4 minutes flat to reserve the spot next to the pole position.

Brian Kinwald shot out in front during the A-main and never looked back. Meanwhile, Sohrab Tavakoli, Phillips, Jimmy Babcock and Derek Furutani battled it out for second, third and fourth. Tavakoli never let go of second, but third wasn't decided until Babcock crossed the line to claim it.

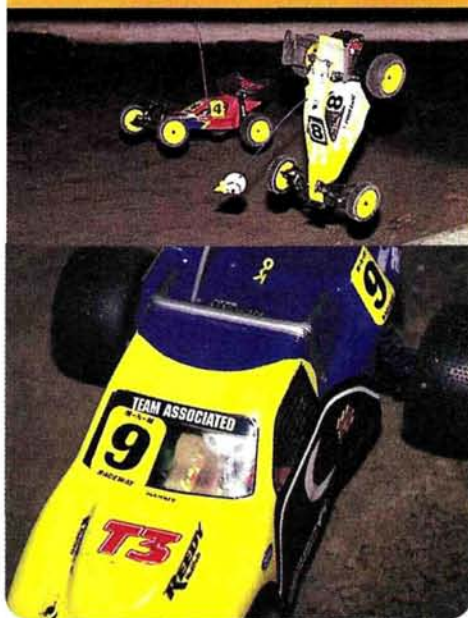
• **Modified Truck.** Chad Phillips barely edged out Team Losi/Maxtec driver Sohrab Tavakoli for the TQ. Peak Performance drivers Derek Furutani and Jimmy Babcock also shone during qualifying and secured spots on the grid that gave them holeshot possibilities.

Phillips shot out in front during the Main with Tavakoli and Furutani following dangerously close behind. Tavakoli spun out going through one of the corners during the first lap and



Where's Jack?

The corporate tycoon and fast-food king who's not afraid to roll up his sleeves and get dirty has found a new way to promote his hamburger franchise. Jack in the Box antenna ornaments also work great mounted on R/C cars, and they provide a gyroscopic effect that's illustrated in the photo below. As you can see, the antenna ornament still has a smile even after having been dragged on the ground, flipped in the air and buried in the dirt. The Jack in the Box antenna ornament also looks cool mounted inside the cockpit of a racing truck or buggy. As you can see, Jack looks really comfortable inside the T3 shown below. You'll be glad to know that Jack survived the weekend, but "he" scheduled an appointment with an ear, nose and throat doctor.



The Sportsman Car A-main finalists.



The Sportsman Truck A-main finalists.



The 2WD A-main finalists. (Amy Runkle passed out the trophies)



The Modified Truck A-main finalists.



The 4WD Modified A-main finalists.



The Stock truck A-main finalists.



The Stock Buggy A-main finalists.

	FIN. QUAL.	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	CHARGER	TIRES	PINION/SPUR	BODY
SPORTSMAN CAR	1 3	Scott Arrington	Losi XX 'CR'	Reedy	GM	LRP	Airtronics 3PS	Tekin	Pro-Line	NA	Jammin
	2 10	Brian Kadar	Losi XX 'CR'	Reedy	VIS	Novak	Airtronics 3PS	Powerflex	Pro-Line	21/82	Losi
	3 4	Jeremy Hase	Associated RC10B3	Reedy	Zappers 2000	LRP	Airtronics 3PS	Tekin	Pro-Line	24/81	Pro-Line
	4 2	Randy Brown Jr.	Losi XX 'CR'	Reedy	Trinity	Novak	Airtronics M8	Tekin	Pro-Line	23/84	Losi
	5 1	Jeremy Felles	Losi XX 'CR'	Reedy	Trinity 2000	Novak	Airtronics 3PS	Tekin	Pro-Line	25/84	Losi
	6 9	Robert Kuhl	Losi XX 'CR'	Reedy	Peak	Tempest	Airtronics 3PS	Novak	Pro-Line	23/82	Losi
	7 8	Bill Cook	Associated RC10B3	Reedy	Team Orion	Novak	Airtronics 3PS	Tekin	Pro-Line	24/81	Protoform
	8 6	Ray Velasquez	Associated RC10B3	Reedy	NA	Tekin	Airtronics 3PS	Novak	Pro-Line	22/81	Associated
	9 7	Jim Cooper	Losi XX 'CR'	Reedy	Peak	Novak	Airtronics 3PS	Victor Super 2 IQ	Pro-Line	25/84	Protoform
	10 5	David Lindsay	Losi XX 'CR'	Reedy	Trinity	Novak	Airtronics M8	Rhino	Pro-Line	23/84	NA
SPORTSMAN TRUCK	1 4	Randy Brown Jr.	Losi XX-T 'CR'	Reedy	Trinity	Novak	Airtronics M8	Tekin	Pro-Line	22/88	Losi
	2 1	Robert Kuhl	Losi XX-T 'CR'	Reedy	ESP	Tempest	Airtronics 3PS	Novak	Pro-Line	22/84	'CR'
	3 2	Fred Fleck	Losi XX-T 'CR'	Reedy	Trinity	Novak	Airtronics	NA	Pro-Line	21/88	NA
	4 5	Bill Cook	Associated T3	Reedy	Reedy	Novak	Airtronics 3PS	Tekin	Pro-Line	19/87	Associated
	5 7	Doyle Howell	Losi XX-T 'CR'	Reedy	Trinity	Tekin	Airtronics	Tekin	Pro-Line	NA	NA
	6 8	Jeff Maurer	Losi XX-T 'CR'	Reedy	Maxtec	Tekin	JR 756	Tekin	Pro-Line	21/88	Losi
	7 3	Byron Kessie	Associated T3	Reedy	Team Orion	Novak	Airtronics	Novak/Tekin	Pro-Line	22/87	Pro-Line F-150
	8 6	Ray Velasquez	Associated B3	Reedy	Maxtec	Tekin	Airtronics	Novak	Pro-Line	22/81	Associated
	9 10	Rick Schmidt	Associated T3	Reedy	Trinity	LRP	Futaba 3PJ	Tekin	Pro-Line	20/81	Associated
	10 9	Earl Valles	Associated T3	Reedy	Team Orion	Novak	Airtronics M8	Tekin	Pro-Line	20/85	Associated
2WD MODIFIED	1 1	Brian Kinwald	Losi XX	Trinity	NA	Novak	Airtronics	Novak	Losi	24/84	Losi
	2 3	Sohrab Tavakoli	Losi XX	Maxtec	Maxtec	Novak	Airtronics 3PS	Novak	Losi	21/81	Losi X-celerator
	3 4	Jimmy Babcock	Losi XX 'CR' Kinwald	Peak 13T	Peak Power	LRP	Airtronics M8	Novak	Losi	21/84	Losi X-celerator
	4 2	Chad Phillips	Losi XX 'CR' Kinwald	Trinity	Trinity	Novak	Airtronics 3PS	Novak	Losi	20/82	Losi X-celerator
	5 5	Derek Furutani	Losi XX 'CR' Kinwald	Peak	Peak Powerflo	Novak	Airtronics M8	Novak	Losi	19/82	Losi X-celerator
	6 6	Jason Cori	Losi XX 'CR'	Trinity	Trinity	Novak	Airtronics M8	Novak	Losi	18/82	Losi
	7 7	Alex Guerrero	Losi XX	NA	Team Orion	Novak	Airtronics	Novak	Losi	NA	Losi
	8 9	Chad Bradley	Associated B3	Reedy	Reedy	LRP	HiTec	LRP	Pro-Line	18/81	Pro-Line Deja Vu
	9 8	Scott Hughes	Associated B3	Reedy	Reedy	LRP	KO Propo	KO Propo	Pro-Line	19/81	Pro-Line Deja Vu
	10 10	Joey Stanovich	Losi XX 'CR' Kinwald	Trinity	Trinity	Novak	Airtronics M8	Novak	Losi	20/84	Losi X-celerator
2WD MODIFIED TRUCK	1 2	Sohrab Tavakoli	Losi XX-T	Maxtec	Maxtec	Novak	Airtronics 3PS	Novak	Losi	19/88	Losi XX-T
	2 4	Jimmy Babcock	Losi XX-T 'CR'	Peak	Peak Power Flo	LRP	Airtronics M8	Novak	Losi	19/88	Losi
	3 3	Derek Furutani	Losi XX-T 'CR'	Peak	Peak Power Flo	Novak	Airtronics M8	Novak	Losi	19/88	Losi 'CR' Truck
	4 7	Bobby Smith	Associated RC10T	Reedy	LRP	Reedy	Futaba	Tekin	Pro-Line	18/87	Associated
	5 5	Brandon Aymar	Associated RC10T3	Peak	Peak	LRP	Airtronics	Tekin	Pro-Line	18/87	Associated
	6 9	Greg Monise	Losi XX-T	Banzai	Trinity	Tekin	Sanwa	Tekin	Pro-Line	17/88	Losi
	7 6	Michael Philip	Losi XX-T 'CR'	Trinity	Trinity	Novak	Airtronics	Novak	Losi	19/87	Losi
	8 10	Brad Niblink	Associated RC10T3	Reedy	Reedy	LRP	Airtronics	NA	Pro-Line	18/87	Associated
	9 8	Red Swaney	Losi XX-T 'CR'	Trinity	Trinity	Novak	Airtronics	Novak	Losi	18/88	Losi
	10 1	Chad Phillips	Losi XX-T 'CR'	Trinity	Trinity	Novak	Airtronics 3PS	Novak	Losi	18/88	Losi XX-T 'CR'
4WD MODIFIED TRUCK	1 1	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Novak	Losi	25/90	Losi
	2 2	Sohrab Tavakoli	Losi XX4	Maxtec	Maxtec	Novak	Airtronics 3PS	Novak	Losi	19/89	Losi
	3 8	Jason Cori	Losi XX4	Trinity	Trinity	Novak	Airtronics M8	Novak	Losi	18/86	Losi
	4 6	Derek Furutani	Losi XX4	Peak	Peak Power Flo	Novak	Airtronics M8	Novak	Losi r19/84	Losi XX4	
	5 9	Frosty St. Clair	Yokomo MX-4	Reedy	Reedy	LRP	Futaba	Competition Elec.	Pro-Line	18/84	MX-4 (Stock)
	6 7	Alex Guerrero	Losi XX4	NA	Team Orion	Novak	Airtronics	Novak	Losi	NA	Losi
	7 10	Shawn Blackwell	Losi XX4	GM	GM	GM	Airtronics M8	Turbo Thirty	Losi	17/84	Losi
	8 3	Jimmy Babcock	Losi XX4	Peak	Peak Power Flo	Novak	Airtronics M8	Novak	Losi	NA	Losi
	9 4	Greg Monise	Losi XX4	Banzai	Trinity	Tekin	Sanwa	Tekin	Losi	18/84	Losi
	10 5	Trevor Adamo	Losi XX4	Trinity	Trinity	Novak	Airtronics	Turbo Thirty	Losi	19/86	Losi
STOCK TRUCK	1 5	Brent BisBee	Losi XX-T 'CR' Plus	Trinity	Trinity	Novak	Airtronics 3PS	Tekin	Losi	20/88	Losi
	2 3	Mike Philip	Losi XX-T 'CR' Plus	Trinity	Trinity	Novak	Airtronics	Novak	Losi	19/87	Losi
	3 7	Jeremy Aymar	Associated T3	Reedy	Reedy	LRP V6	Airtronics M8	Novak	Losi/Pro-Line	19/87	Associated
	4 10	Geoff Monise	Losi XX-T 'CR'	Banzai	Trinity	Tekin	Airtronics	Tekin	Losi	23/88	Losi
	5 8	Peter Lopez	Losi XX-T 'CR'	Banzai	Pro-Match	Novak	Airtronics	Novak	Pro-Line	18/87	Losi XX-T 'CR'
	6 9	Will Martin	Losi XX-T 'CR'	Trinity	Trinity	Novak	Airtronics	Novak	Losi	19/88	Losi
	7 2	Bryan Wimberry	Associated T3	Reedy	Reedy	LRP V6	Airtronics	Novak	Pro-Line	18/87	Associated
	8 4	Rodney Angelito	Associated T3	Trinity	Reedy	Novak	Airtronics 3PS	Competition Elec.	Pro-Line	20/87	Associated
	9 1	Charlie Albrecht	Losi XX-T Graphite Plus	Peak	Peak Power Flo	Novak	Airtronics	Novak	Losi	19/88	Losi
	10 6	Jake McGarvey	Losi XX-T 'CR'	Trinity	Trinity	Novak	Airtronics	Tekin	Losi	19/87	Stock
2WD STOCK	1 1	David Mangelsdorf	Losi XX	Trinity	Peak	Novak	Airtronics	Novak	Losi	22/78	Losi
	2 2	Andy Smolnick	Associated RC10B3	Reedy	Reedy	LRP	Airtronics	Tekin	Pro-Line/Losi	24/84	Associated B2
	3 6	Josh Anderson	Associate B3	Reedy	Reedy	LRP	Airtronics M8	Indi	Pro-Line	22/81	Associated
	4 3	Joey Stanovich	Losi XX Kinwald	Trinity	Trinity	Novak	Airtronics M8	Novak	Losi	22/78	Losi X-celerator
	5 4	Charlie Albrecht	Losi XX 'CR' Kinwald	Peak	Peak Power Flo	Novak	Airtronics	Novak	Losi	22/84	Losi
	6 8	Jeremy Aymar	Associated B3	Reedy	Reedy	LRP V6	Airtronics M8	Novak	Losi/Pro-Line	23/81	Associated
	7 7	Will Martin	Losi XX 'CR' Kinwald	Trinity	Trinity	Novak	Airtronics	Competition Elec.	Losi	NA	Losi
	8 9	James Elliott	Losi XX 'CR'	ESP	ESP	Novak	Airtronics	Tekin	Pro-Line /Losi	25/76	Stock
	9 10	Jeremy Kopp	Associated	Bennett	Pro-Match	HiTec	HiTec	Tekin	Losi	22/84	Losi X-celerator
	10 5	Travis Amezcua	Associated B3	Reedy	Reedy	LRP	Airtronics	NA	Pro-Line	22/81	Associated B3

that caused a pileup and let Furutani by to claim the lead. Babcock found himself in second, while Tavakoli cut the track and regained fourth behind Bobby Smith. Unfortunately, TQ Phillips got stuck on a pipe and was left behind in a trail of dust.

At the 2-minute mark, Furutani's lead looked solid, but fourth-place Tavakoli passed Smith and was soon all over Babcock's tail. Having passed Babcock, he set his sights on the leader. Toward the end of the race, Furutani got a little squirrely going through one of the rough sections of the track and Tavakoli tapped him lightly from behind and that caused Furutani's truck to loop out and get stuck on a pipe. Tavakoli took the lead, while Babcock claimed second and Furutani got back on the track just in time to claim third.

• **4WD Modified.** Brian Kinwald was in a league of his own as evidenced by his TQ time, which was more than 12 seconds faster than that of his nearest competitor, Sohrab Tavakoli. He and Tavakoli were the only drivers who completed 12 laps.

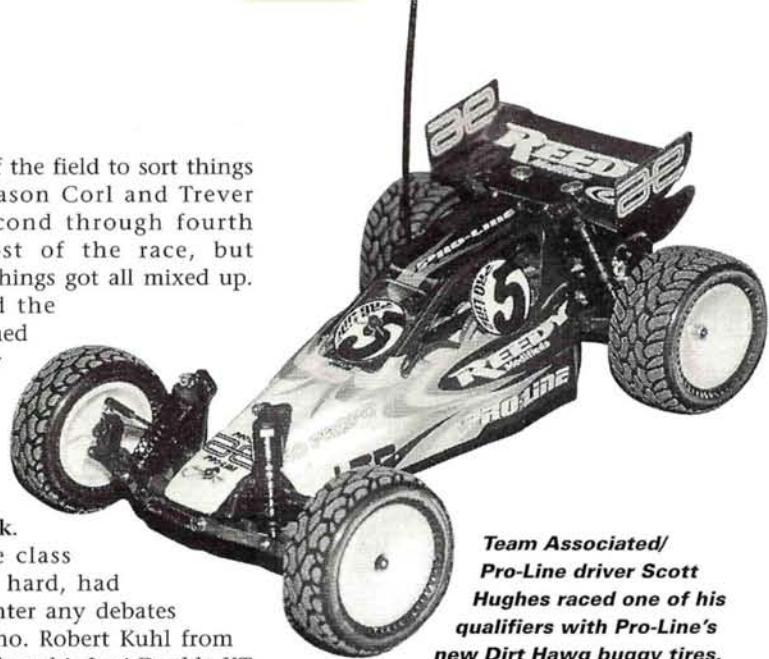
During the Main, Kinwald once again shot out in front and never looked back,

leaving the rest of the field to sort things out. Tavakoli, Jason Corl and Trever Adamo held second through fourth throughout most of the race, but toward the end, things got all mixed up. Kinwald crossed the line first and earned the only victory lap; Tavakoli finished second and Corl secured third.

• **Sportsman Truck.**

These guys were class acts. They raced hard, had fun and didn't enter any debates about who hit who. Robert Kuhl from Apple Valley, CA, kept his Losi Double-XT on a tight line and ended up with a 10/4:02.75 to take the TQ and the prime spot on the grid. Fred Fleck, Byron Kessee and Randy Brown also raced diligently and finished with times that were less than 4 seconds slower than the leaders.

During the Main, Kuhl used his choice spot on the grid to his advantage and stormed out in front while the rest of the pack ran into a bottleneck going through the chicanes. Fleck was close behind and



*Team Associated/
Pro-Line driver Scott
Hughes raced one of his
qualifiers with Pro-Line's
new Dirt Hawg buggy tires.
His car was hooked up well.*

Brown was making his way into the action. During the final minute, Brown passed Fleck and was soon at the leader's back door. Apparently, Kuhl just couldn't take the pressure because he provided the opportunity and Brown, who wasn't shy, took the handout. Brown finished in first, Kuhl in second and Fleck rounded out third.

PURE EXCITEMENT

VECTOR Spec 99



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• **Sportsman Buggy.** Randy Brown from Huntington Beach, CA, set the TQ pace early in the first round, but Jeremy Felles from Placentia, CA, stole it away in the third and final round. Scott Arlington was the only other driver to post an 11-lap

run during qualifying, but Jeremy Hase just missed going the extra lap by a fraction of a second.

During the A-main these drivers mixed it up in grand style. Arlington got the holeshot and entered the first corner before anybody, but Brown was quick to follow and closed the door on TQ Felles. At around the 1-minute mark, Brown took the lead away from Arlington and

hung around in front for a while. Meanwhile, Felles continued to drop behind, while Brian Kadar, who had started way back in the nosebleed section, started to move up.

At the sound of the buzzer, things changed significantly. Arlington got the lead back from Brown and crossed the line first. Kadar continued to pick off cars until he was at the leader's back door to claim second. And Hase finished in the same place as he had qualified—third. As for TQ Felles, well, he finished fifth.



Peak Performance driver Derek Furutani wrenches on his Losi Double-Xt during a break in the action.

Local hot shoe Brian Hyland works on his Associated B3. This guy is pretty fast.



FINAL THOUGHTS

The Endless Summer Classic was filled with fun and excitement, and the staff at M n M Hobbies once again did an awesome job of managing the event. As always, I congratulate the champions in each class and thank all the racers who attended. Hope to see you there next year. ■

PURE EXSITEMENT

www.serpent.com



Our totally new Team Serpent Network website is a lot like our Vector Spec 99 – fast, powerful, and loaded. Set-up a [customized home page](#) that presents the info *you* want (even the [language](#) you want it in, comprende?). See which friends are on-line and jump into a [chat](#) to discuss important topics like fuel consumption, tires and which race has the best track food. [Ask the Pros](#) technical questions, and the [racer forums](#) let everyone rant and rave.

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HOW TO Tune the Associated RC10B3

Mark Pavidis' top-secret tuning tips revealed

by Eugene "Geno" You



TEAM ASSOCIATED*'s RC10B3 is a world-class buggy that can win anytime, anywhere; but sometimes, my setup is simply not right for a particular track layout or conditions and could use improvement. I wanted a clear and concise way to approach setting up my B3 so that I'd be able to make it stick to the track like servo tape no matter where or when I race it.



This article considers all aspects of car setup. It is for racers who want all the information on setups, pro tricks and the "secret" tweaks that separate the fast from the truly ballistic—in short, what to do, when to do it and why it should be done.

A trip to Team Associated and a long conversation with IFMAR 4WD Off-Road Champion Mark Pavidis were all that I needed to end the guesswork. Read on; Mark's trade secrets are now passed on to you!

THE A-TEAM'S STANDARD SETUP

Most of the Associated Team drivers arrive at the track with a standard setup that is different from the factory setup. But you should build your B3 according to the instructions (factory setup), and then run it at your track. When you feel you're as fast as you can be with those settings, switch to Mark's standard setup and see whether your laps improve. I tried it, and it does work on most tracks, so listen up.

■ FRONT END

Shocks

- mounting position (upper/lower): outside/inside
- oil: 35WT
- springs: Green
- pistons: no. 1

Weight added: ¼ oz. (inside the front bulkhead)

Inside limiters: 1 thin (0.30 in.)

Kingpin position: middle (one spacer on top, one on bottom)

Caster: 25 degrees

Toe in/out: none

Camber: 1½ degrees negative

Camber-link position: outer hole

Ride height: A-arms slightly above level

Tires: Pro-Line ribbed M3

Wheels: Pro-Line wide

■ REAR END

Shocks

- mounting position (upper/lower): middle/outer
- oil: 30WT
- springs: Silver
- pistons: no. 1

Inside limiters: none

Arm mount: 3 degrees toe-in

Anti-squat: stock

Hub-carrier position: forward (both spacers installed on the rear of the hub carrier)

Camber-link position (shock tower and hub carrier): inside

Ride height: CVDs level

Tires: Pro-Line Square Fuzzies (M3 compound)

Wheels: Associated 2.2

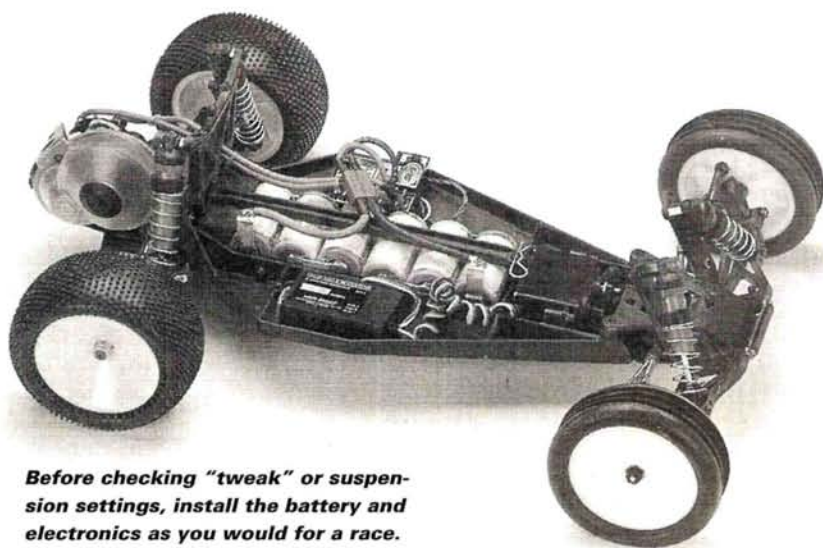
Spur gear: 81-tooth

Pinion: 18-tooth with a 10-turn double modified motor/19-tooth with an 11-turn double mod motor

■ Battery position: middle



Along with the usual pit tools, these items will help you get your B3 dialed: an RPM camber gauge, a spare set of rear rims, calipers, string or monofilament and a "setting board" such as the Take Off unit shown here (Yokomo makes an excellent one as well).



Before checking "tweak" or suspension settings, install the battery and electronics as you would for a race.

Building the ultimate shock

Everyone has his own way to bleed shocks, but this one is foolproof; it will get you consistent results, time after time. A well-tuned shock is one in which no air is present when the shock is compressed. Sound simple? It is. Here's how you do it.

1. After assembling the shock, fill the body halfway with oil. Compress the piston a few times to remove any trapped air. Wait for air to surface.
2. Completely fill the shock body with oil. When this is done correctly, the oil will dome at the top of the body.
3. Fill the shock cap with oil, then quickly attach the cap to the shock body, being careful not to spill any oil. (This does take practice, so be sure to have a rag handy.)



Fill the shock only halfway with oil, and allow air bubbles to surface. If you initially fill the shock only halfway, there is less oil for the bubbles to be trapped in.

When all the air bubbles have been released, fill the shock until the oil domes at the top.



Fill the cap with oil as well. Although this can make assembly messy, it minimizes the air trapped in the shock.



Quickly assemble the cap and body. Keep a rag handy!

Graphite everything

Yes; many of the pros, including Mark Pavidis, swap the stock components for lighter, graphite components. In the modified class, you can go just as fast with the box-stock pieces. Yep; you heard right. Most of the Associated team drivers use the stock chassis, and this tells me that the kit pieces are more than sufficient. If you feel the need to upgrade, you can't go wrong with graphite, but don't expect to go much faster.

On the other hand, if you race in the stock class, every gram you can shave off will make a difference. Replacing all the molded composite chassis and suspension pieces with graphite will shave off nearly an ounce.

Adjusting chassis tweak

Although chassis tweak does not affect off-road racing as much as on-road, Mark Pavidis always takes the time to make sure that his car's chassis is not tweaked. To do this, he checks how weight is distributed around the chassis with the motor, battery and electronics installed. Here's how Mark sets the tweak and adjusts the weight distribution on his car.

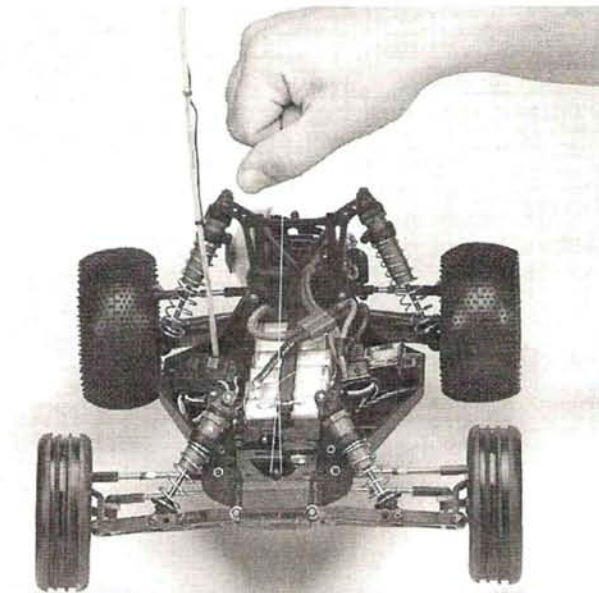
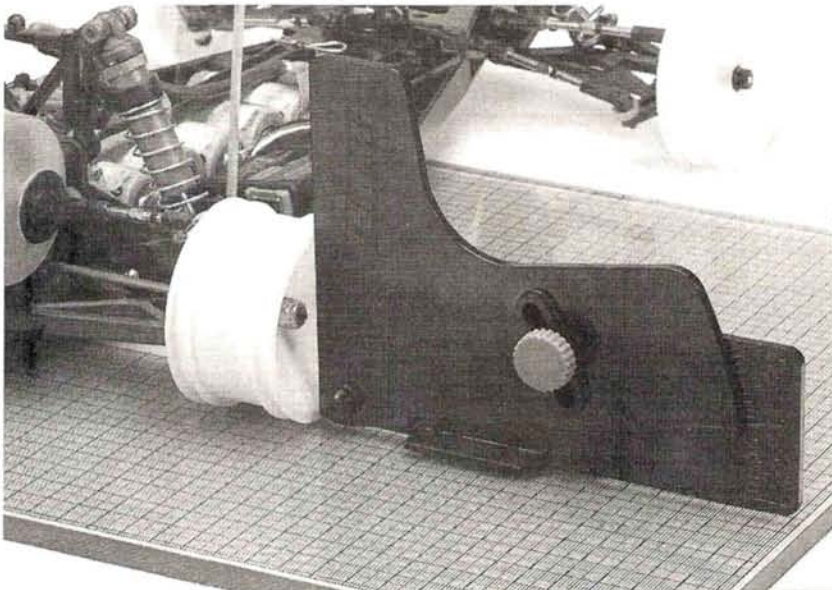
To take accurate measurements, your B3 will have to be on a perfectly level, flat surface. (A Yokomo* acrylic setting board is great for this, and it's portable.) Use an extra pair of B3 rear wheels (without the

tires) as a car stand when you make adjustments.

Before you start, make sure that your B3 is race-ready. The left and right front shocks must be exactly the same length, and so should the left and right rear shocks. (Inexpensive calipers do a fine job of measuring shock lengths precisely.)

Also, check the camber angles on the wheels before you start; both fronts should

have identical camber, as should both rears. (An RPM* camber gauge is the right tool for this job.)

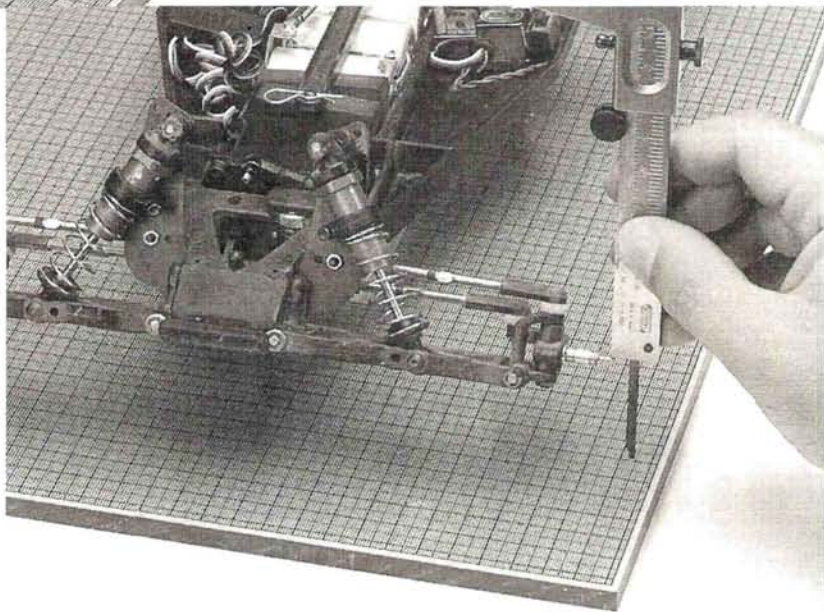


Above: fishing line or string is tied through the body mounts to serve as a balance point. The heavy side of the car will tilt downward; add weight or reposition the electronics to compensate for this.

Left: for optimum accuracy, measure camber with the rims bare. Make sure the camber angles are the same for each pair of wheels.

NOW FOLLOW THESE STEPS

1. Remove the tires and put the chassis on top of the two B3 rear wheels.
2. With calipers, measure the distances between the surface and the tip of the left front axle and the tip of the right front axle. If the measurements aren't identical, the chassis is probably tweaked.
3. You can adjust tweak by lengthening the shock on the side with the higher measurement, or by shortening the shock with the lower measurement. To shorten the shock, tighten the ball cup on the shock shaft; to lengthen it, loosen the ball cup. Repeat this simple process on the rear end, and you'll be halfway there.
4. Re-install the wheels (with tires) because it's time to adjust weight distribution. To check the car's side-to-side weight distribution, you need to make a handle that runs along the chassis centerline. To do this, run a 5- or 6-inch piece of string or fishing line through the hole in the front body mount and make a loop at one end. Next, tie one end of a 12- to 14-inch string to the loop in the first string, and thread the other end through the hole in the rear body mount. You now have a handle!
5. Lift the B3 using this string handle. If the car tilts to either side, one side is heavier than the other and the chassis is tweaked; reposition the electronics, or—if you don't mind extra weight—add weight to the lighter side.



Above: the height from the setting board to the axle is measured for the left and right axles, and the results are compared to determine whether the suspension is tweaked. Use the bare rims as a stand; they're sure to hold the chassis level. Commercial car stands aren't meant to be tuning aids and may be off a few degrees.

Where to start wrenching

What should you change to get the results you desire? The A-team's standard setup is highly effective, so 90 percent of all B3 tuning comes from choosing the proper tires. This is critical. Most of the locals will be able to tell you right away what usually works at the track, so don't be afraid to ask!

Try one or more of these (one change at a time, so you'll be able to tell which makes a difference):

■ NEED MORE STEERING?

1. Check the servo-saver spring; is it too loose?
2. Raise the rear ride height approximately 0.30 inch.
3. Shorten the rear camber links to increase rear camber.
4. Change the upper shock-mounting position to the middle hole.
5. Move the kingpin upward by installing washers beneath the pivot-ball end, one washer at a time.
6. Add a 0.30-inch inside limiter to the front shocks.
7. Move the battery forward.
8. Move the hub carrier backward, one spacer at a time.
9. Use stiffer rear tires (M2 compound instead of M3s).
10. Loosen the diff slightly (but not so much that it slips).

■ NEED MORE REAR AND SIDE BITE?

1. Lengthen the rear camber link to decrease camber.
2. Remove the weight (1/4 ounce) from the front bulkhead.
3. Increase anti-squat by adding an aluminum washer to the front of the rear arm mounts.
4. Use a larger—87-tooth—spur gear (a larger spur gear moves the motor toward the rear). Don't forget to change your pinion to compensate for the larger gear.
5. Move the battery toward the rear.
6. Use 1.32-inch rear shafts with two, 0.60-inch inside limiters.

Setting up for high-bite or slippery track conditions

These tuning tips will get the B3 dialed in on high-bite and slippery tracks—two very common conditions. Start with the standard setup.

If, after you've tried these suggestions, your car still needs more steering or more rear traction, try the tips given in "Where to start wrenching" to add steering or increase rear, forward or side bite.

■ HIGH-BITE TRACK

1. Lower the ride height by adding one more 0.30-inch limiter inside the front and rear shocks.
2. Add up to 1/2 ounce to the front bulkhead.
3. Use Silver springs in the rear.

■ LOOSE TRACK

1. Lengthen the rear camber link (use the outside hole on hub carrier).
2. Remove the weight from the front bulkhead.
3. Switch to Silver front springs.
4. Add an aluminum washer to the front of the rear arm mounts.
5. Use larger spur gear—87-tooth.
6. Move the battery toward the rear.
7. Raise the front and rear ride heights slightly (0.30 inch).

FINAL THOUGHTS

I sincerely hope that this article helps you to get your B3 dialed; this information sure helped me to get mine running super fast!

Don't forget that radio settings are also very important. Make sure that you have full throttle and full brake and that the steering servo has full throw in both

directions. If everything checks out, then you only have to adjust your radio to the track as necessary.

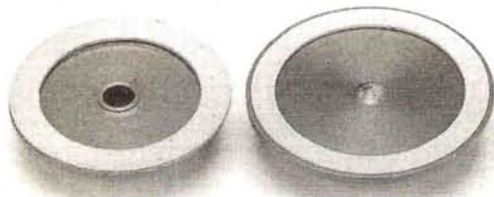
Finally, remember the most important factor of all: driving. There is absolutely no substitute for practice. Grab your gear and this copy of *R/C Car Action*, and head to the track. I know I've given you a lot to

Differential and slipper adjustments

Yes; a looser diff will give you more on-power steering, but the diff shouldn't be so loose that it slips. If you hear a loud "bark" when landing off jumps, stop the car right then, and tighten the diff slightly. It is also absolutely essential that you build the diff with the supplied Stealth diff lube and black grease. Mark Pavidis does not use anything else, so why should you?

On your B3's first run, have the slipper a little on the loose side so that all the transmission parts will have time to properly seat themselves. After three or four easy laps, tighten the slipper gradually until the slipper nut is flush with the input shaft. Make final adjustments at your track on the slickest stretch. Adjust the slipper so that, after a full-throttle punch, it slips for 2 to 3 feet before it engages fully.

When they run in the stock class, many of the Associated Team drivers replace the B3's slipper clutch with a B2 slipper because it's more effective and forgiving when run with a stock motor, which doesn't have the brutal power of today's modifieds. But keep in mind that the B3 slipper-clutch pad has an approximately 15 percent larger surface area than the B2's, so it's less likely to slip.



The larger diameter of the B3's slipper disk (right) compared with the B2's (left) provides a 15-percent-larger surface area. This can help or hinder, depending on the track.

Wheels and tires

When you change your battery pack, rotate your tires. On careful inspection, you'll notice that the tires wear differently, and this is the result of track surface and layout. For example, if you have a long left sweeper heading to the straightaway, the ribbed, left front tire will wear quicker because it grabs the surface as the car turns. In the rear, you may see that the rear pins start to show signs of wear just after one run. Swapping the tires from one side to the other will extend tire life and the consistency of their performance.

I noticed that Mark Pavidis mounts his tires with the Pro-Line logo facing inward. He says the raised Pro-Line logo may act as a tread pattern during hard cornering. He says he does not mount his tires this way all the time, but for a big race, he does!



The sidewall's raised Pro-Line logo may act as a tread pattern when cornering hard; for total consistency, mount the tires with the logos facing inward so only smooth rubber shows.

absorb, so take your time and you'll learn to set up your car like a pro. When your B3 flies around the track much faster than before, you'll agree it was time well spent.

Go fast and have lots of fun!

**Addresses are listed alphabetically in the Index of Manufacturers on page 225.*

Tuning and Modifying the **Schumacher** **FIREBLADE** **USA**

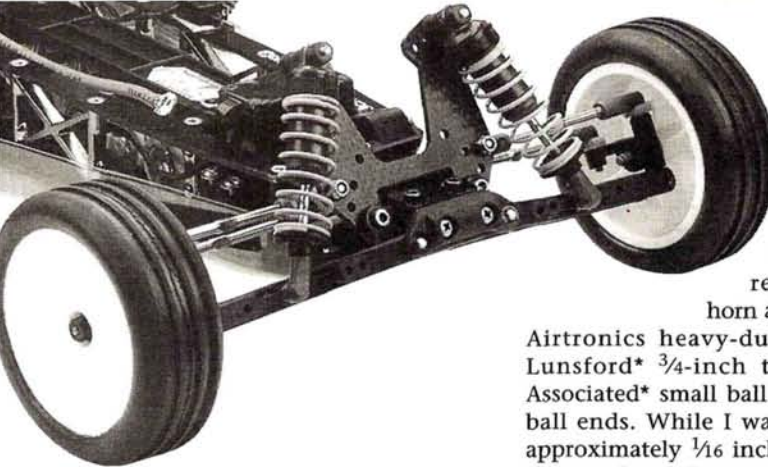
by Eugene "Geno" You

It has been several months since I wrote the original Schumacher* Fireblade USA "Thrash Test" (September '98 issue). Since then, my Fireblade and I have done quite a bit of traveling and have found success at every track we've visited—as evidenced by several stock-class victories. In my opinion, the Fireblade is a competitive buggy—stock, right out of the box—but the car can benefit from a few smartly placed options and some good, old-fashioned wrenching to work really well in the pro modified class. Follow along; I'll show

you how to make the Fireblade 2000 better, stronger and much faster!



Although the front end of my Fireblade looks stock, a careful inspection reveals several refinements. The Schumacher alloy shocks are a worthwhile investment and will provide smoother damping than the stock units. The gray springs are also options, as are the 25-degree-caster blocks.



• **Steering.** The first thing I noticed when I installed a modified motor was that the Fireblade had a tendency to push on power.

Close observation revealed that the

SETUP

FRONT END

- **Shocks**
 - position (top/bottom): outside hole/inside hole
 - oil: Schumacher 35WT
 - piston: two holes open
 - internal limiters: none
 - toe-in/out: 0 degrees
 - length (overall): 81mm
 - ride height: arms at level
 - springs: Schumacher gray
- **Weight added:** 7g to front bulkhead
- **Camber link:** outside hole in shock tower
- **Modifications:** Associated axles installed in front hub carriers
- **Wheels/tires:** Pro-Line 2.2 wide front wheels (part no. 2639Y) with Pro-Line 4-rib front tires (Pro-175M3)
- **Battery position:** forward

REAR END

- **Shocks**
 - position (top/bottom): upper hole/middle hole
 - oil: Schumacher 30WT
 - piston: 2 holes open
 - internal limiters: none
 - length (overall): 103mm
 - ride height: CVDs level
 - springs: Schumacher gray
 - hub carrier position: rearmost
 - camber link: upper row; inside hole
 - anti-squat/toe-in: stock
- **Wheels/tires:** Schumacher dish wheels/Pro-Line Flat Fuzzies (M3 compound)

ELECTRONICS USED

- Tekin's G9 Supersonic ESC
- Airtronics Caliber 3PS transmitter and dedicated FM receiver
- Airtronics 737 servo
- Maxtec VTX RC2000 batteries
- Maxtec ShockWave 11-turn, single-modified motor
- Deans Ultra Plugs

Team Associated front axles were modified to fit inside the stock axle carriers. This modification allows the use of Pro-Line wide wheels and tires.

stock servo horn was flexing, and the steering link was a bit sloppy. I

replaced the servo horn and linkage with an Airtronics heavy-duty servo horn, a Lunsford* 3/4-inch titanium tie rod, Associated* small ball cups and MIP* BJ ball ends. While I was at it, I removed approximately 1/16 inch of material from the inside of the steering bellcranks to increase steering travel. The Fireblade's steering system is now much more solid and provides more steering throw, which eliminated the push.

• **Front suspension.** Schumacher recently released new caster blocks that reduce front caster from 30 to 25 degrees. As my past off-road racing experience indicates, less front caster equals more steering under power, so sign me up! Here's a hot tip if you'd like to take advantage of all the wide, front tire and wheel combinations that are available: replace the stock front axles with Associated front axles (part no. 6219). To install them inside the stock steering knuckles, you'll need to round off the points on the hex portion of the axles with a file or rotary tool; this will allow the kingpin sleeve to slide in and hold the axles securely. To raise the kingpin's mounting position, you'll need to add a 0.30-inch spacer between it and the steering knuckle.

In my opinion, running wider front wheels and tires dramatically improves this car's overall steering response. I used Schumacher titanium hinge pins and turnbuckles for added strength. I also added 7 grams

of weight to the top of the bulkhead (not shown), and this makes the car feel more "planted" when cornering under power.

• **Rear suspension.** My modifications to the front end of the Fireblade required me to make some corresponding changes to the rear of the car to preserve its forgiving handling. Nothing complicated here; for the camber link, I ended up using the inside hole on the top row to achieve the correct balance; the front end steered admirably while the back end still felt planted. For very high-bite tracks, I used a rear stabilizer bar with great success. I did use a slightly lighter shock oil when I was bolting up the swaybar, though; I did this to maintain proper "pack" when the suspension goes through its full travel. I also used Schumacher titanium turnbuckles and hinge pins in the rear.

• **Shocks.** You might remember that in the Fireblade's "Thrash Test," I recommended the optional aluminum-alloy shocks. They're truly a world-class design. They proved to be very consistent, and they allowed the suspension to do its job flawlessly. Schumacher was kind enough to send me samples of its new shock oil. I'll go on record and say it's some of the most consistent oil I have tried.



Inside the Fireblade's gearbox is an alloy idler gear; I consider it a must for modified racing. The optional slipper clutch should also be considered a must-have. I use Schumacher's Viscous Drive traction-control system (not shown) whenever the track becomes rough or slippery.

PARTS LIST

SCHUMACHER PARTS

- Titanium turnbuckle set—part no. L004.
- Titanium hinge-pin set—L013.
- Alloy pro shock bodies (set of 4)—U1963.
- Slipper clutch—U823.
- Slipper layshaft—U1414.
- Viscous Drive unit—U1787.
- Viscous layshaft—U1791.
- Purple plastic servo mounts—U2095.
- Purple plastic chassis gates—U2097.

- Purple plastic aerial mount—U209.
- Alloy idler gear—U2018.
- Alloy rear block (0 degree)—U1988.
- Alloy rear block (3 degree)—U1989.

AFTERMARKET PARTS

- MIP blade-type Schumacher CVDs and BJ balls.
- Lunsford 3/4-inch Punisher titanium tie rod.
- Associated ball cups.

• **Transmission.** Schumacher's Viscous-Drive Traction System proved invaluable on outdoor tracks with very bumpy, loose surfaces. When traction is available, however, the standard slipper was the hot ticket for proper hookup. In the past, I had trouble with Schumacher's molded idler gear, and I consider the alloy idler absolutely necessary for running those brutal modified motors. Also worth mentioning are the more finely pitched internal gears that are available from Schumacher. These quieted the transmission and provided very precise power transfer.

The differential proved simple to maintain. I installed bearings in the diff, though, to make it as smooth as it could be. After many ballistic runs with hot motors and batteries, I began to really appreciate the concept of the Schumacher blade-type universal drive shafts. The aluminum outriders showed no wear; I mean zero—zip! The plastic pieces snap right into the dogbone, and I replaced them only once during months of track testing. Great design, Schumacher! Even though the Schumacher blades proved to be bulletproof, I installed a set of MIP's new blade-type CVDs for Schumacher vehicles. These things are trick!

Another close observation revealed that "standard" spur gears can be bolted right

onto the stock spur-gear mount without modification. Schumacher's spur gears work great, but it's good to know that you won't need to look too far for a replacement.

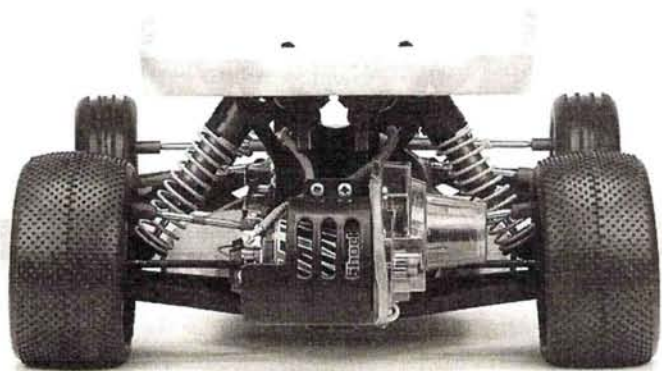
Worth mentioning is the unique sound that the Fireblade makes when you use an extremely low-turn modified motor. My track buddies agree that it sounds almost like a 4WD sedan; too cool!

PERFORMANCE

My hopped-up Fireblade was tested at three California tracks: SoCal Raceway in Huntington Beach, Hawk's R/C Raceway of Sacramento (formerly called Hobby Warehouse) and Hot Rod Hobbies in Saugus. These venues gave me a proper perspective on the Fireblade's adaptability to different tracks.

I will say this much: the Maxtec* 11-turn, single-modified motor and VTX batteries I chose provided "see you later" horsepower! The Airtronics* 737 delivered plenty of steering, and the Tekin* G9 had endless punch, which this car definitely needed. It was just awesome to open up the Fireblade on the straightaway! The chassis setup changes accomplished exactly what I wanted them to—more steering under power without washing out the rear end.

The Fireblade showed world-class character and provided a tremendous amount of steering while retaining its forgiving feel. The Fireblade showed no sign of on-power



Alloy shocks are found back here, as is Pro-Line rubber. Schumacher titanium turnbuckles and hinge pins are used throughout, and the MIP blade-type CVDs are, in a word, awesome.

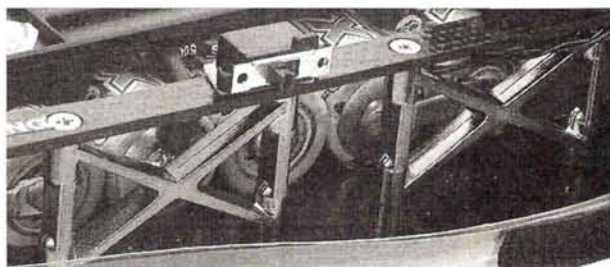
push. The Schumacher slipper clutch was a bit tricky to set at first, but with some TLC and time, I found the correct adjustment that allowed me to leave the line hard and fast. The Fireblade's jumping looked even better; it seemed to spring off the largest jumps level and flat. I love to see the Fireblade jump, as it seems to feel right at home hanging in midair.

Tires are about 90 percent of the tuning process, and the Pro-Line* M3 Flat Fuzzies and Holeshot rears and four-rib front tires never let me down; traction was always there for the taking! Other than that, all I needed to do to get the Fireblade dialed on all three tracks was to change the shock oil and limiters. The Fireblade's lap times were identical to those of all the fast drivers who usually dominate these tracks, so I knew I had a winner on my hands.

FINAL THOUGHTS

My Schumacher Fireblade USA was always ready, willing and able to take on a challenge. In hopped-up trim, however, it's now ready for world-class competition. If you're looking to run with the fast guys, the Fireblade can definitely give you the speed you need.

*Addresses are listed alphabetically in the Index of Manufacturers on page 225.



Schumacher offers several purple plastic pieces that look as if they're made of anodized aluminum. The chassis cages, servo mounts and antenna mount dress up the chassis without adding any weight.

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MIP

.12 Engine Hop-Ups MIP's got gas ... parts

Eustace Moore—president of Moore's Ideal Products (MIP*)—has a long history in nitro racing, so it comes as no surprise that his company has developed a line of accessories for the .12-size nitro engines that are popular here in the U.S.

• **Cylinder head.** Designed to enhance performance by increasing cooling and reducing weight, the MIP head will fit the O.S. .12 CZ-R, CZ-Z and CV and the Thunder Tiger Pro 12 BZ. The CZ-R and CZ-Z heads are purple anodized, while the CV and Thunder Tiger Pro 12 BZ heads are finished in a sharp gun-metal gray.

• **Buttsink.** Designed to complement the cylinder head, the buttsink offers additional cooling for increased performance and longevity. To increase performance, use it to convert a pull-start engine into a non-pull-start. When installed, the buttsink hangs about 2mm below the bottom of the

LIKES

- Includes *all* installation hardware and a glow plug
- Precision fit and machining.
- All this stuff works!

DISLIKES

- Buttsink might hang too far below engine crankcase for non-pull-start applications such as the Nitro RS4 (the engine must be shimmed slightly to achieve the necessary clearance).

crankcase; this should not cause a problem in most applications, but you should measure for clearance before you buy one. The buttsink for the O.S. .12 CV is finished in the same gunmetal gray as the cylinder head, and the ones for the O.S. .12 CZ-R, CZ-Z and Dynamite engines are available with purple or red anodizing.

• **Boost chamber.** With this offering, MIP introduces the boost chamber to 1/10-scale nitro racing. The chamber captures the pressurized air/fuel mixture that is

trapped in the intake passage when the rotary valve in the crankshaft closes. When the valve opens again, the contents of the chamber are released into the intake passage. This improves low-end throttle response and fuel economy.

The boost chamber simply caps off the rear engine cover to provide an area in which to "store" the air and fuel mixture that would otherwise be wasted. To install it on engines that use a pinch-style retainer for the carb, you'll have to do some drilling. The boost chamber fits the O.S. .12 CZ-R, CZ-Z, and CV (requires drilling), the Thunder Tiger Pro 12 BZ and Dynamite engines.

• **Boost bottle** (not shown). Use the boost bottle with engines that don't accept the boost chamber or don't have enough clearance for it. The bottle design works in the same way as the chamber and offers the same performance advantages, but it can be mounted alongside the engine or in another convenient location.

All MIP's nitro racing accessories meet the high standards that we have come to expect from this company. And not only are the parts themselves of very high quality, but MIP also includes *all* the necessary installation hardware (not all manufacturers do this). The cylinder head comes with the bolts and a shim, the buttsink includes a new gasket and bolts, the boost chamber Well, you get the idea.

Part nos. and prices

Cylinder head

O.S. .12 CZ-R, CZ-Z (purple)—part no. 3009, \$24.95.

O.S. .12 CV, Thunder Tiger Pro 12BZ (gray)—3037, \$29.95.

Buttsink

O.S. .12 CZ-R, CZ-Z, Dynamite (purple/red)—3020/3027, \$19.

O.S. .12 CV, Thunder Tiger Pro 12BZ (gray)—3036, \$19.

Boost chamber

O.S. .12 CZ-R, CZ-Z, O.S. .12 CV; call for info.

—Steve Pond



RPM

Bearing Blaster

Put a hurt on dirt!

Proper cleaning will prolong the life and performance of your car's bearings, but getting a bearing truly clean isn't easy. The problem is the shield—that thin ring of metal that covers the balls (some bearings are unshielded or “open”—you can see the balls—but these are not common in R/C cars). The shield makes it difficult for motor spray or other spray solvents to penetrate the bearing and carry out contaminants. Sure, the bearing gets wet inside, but the solvent doesn't have enough spray force to get the crud out. Soaking bearings in



LIKES

- It works: bearings go in dirty, come out clean.
- Small and light, so it's easy to add to your pit box.

DISLIKES

- Blasting your bearings can be messy.

solvent and agitating (shaking) helps, but who wants that hassle?

RPM* offers a better way with its new Bearing Blaster (part no. 8117). This molded-plastic goodie accepts bearings with an outside diameter of 21mm or less and uses any spray solvent with an extension tube to “blast” (hence the name) bearings clean.

Using the Bearing Blaster is a no-brainer; just place the bearing on the conical “base cap,” cover it with the “pressure ring,” slide the spray cleaner's extension tube into the pressure ring's opening and squirt. The solvent can't escape the tool unless it goes through the bearing, and the solvent can't go through the bearing without taking any and all crud along with it. It took only a two-second blast to transform the gritty hub bearings of my XX-4 into smooth rollers, far less time than I would ordinarily spend on the task.

It should be noted that true sealed bearings (such as Dynamite Red Seal, Tamiya “blue” and other Teflon/fiber-sealed bearings) cannot be effectively cleaned with the Bearing Blaster unless the seals have been removed. Check with the bearing manufacturers for cleaning info.

The Bearing Blaster can also effectively lube bearings if you use a spray lube. Regardless of what you spray, be sure to keep a rag under the Blaster; its flow-through design doesn't capture the solvent/lube. This prevents dirty solvent from flowing back into the bearing, but it also makes a mess.

—Peter Vieira



PHOTOS BY WALTER SIDAS

TAKE OFF

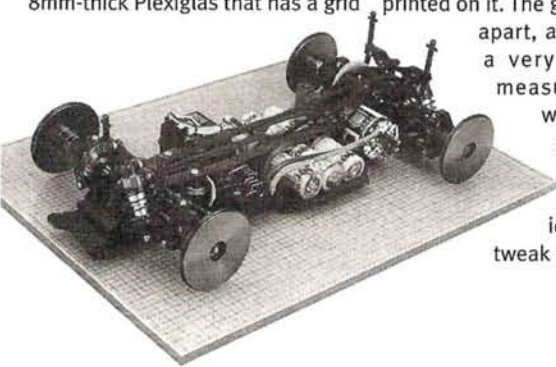
Set Up Board and Set Up Wheels

Board game

Everybody knows that proper chassis setup is critical to vehicle performance, and most of us have at least one or two tools for measuring such vehicle parameters as camber and toe-in. However, those tools may be rendered useless if you don't have a flat, “true” surface to measure the car on—you know, the exact opposite of the hunk o' plywood or wobbly folding table you pit on. By the same token, the sidewalls of your car's tires probably aren't the most consistent surfaces in the world for camber measurements, and what about those times when you want to accurately measure your car's track? A ruler placed across the tops of the tires isn't exactly machine-shop precise.

Take Off*, a Japanese company whose products are now distributed in the U.S. by Schumacher, offers a pair of items that can help. The Set Up Board and Set Up Wheels are precision pieces designed to allow easy, accurate chassis measurements. The board is a substantial piece of 8mm-thick Plexiglas that has a grid printed on it. The grid lines are 1mm

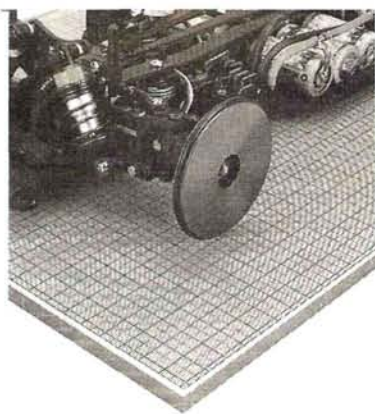
apart, and that provides a very fine scale for measuring width and wheelbase. And, given its perfectly flat surface, the board is ideal for checking tweak and ride height.



To get the most benefit from the Set Up Board, however, Take Off's Set Up Wheels are a must. Simply bolt on these machined aluminum disks in place of your touring car's wheels (the wheels accept “standard” 12mm drive hexes). The slab-sided wheels offer a flat, smooth face for accurate camber adjustments with an RPM camber gauge or a similar tool, and the thin, O-ring “tire” makes it easy to see precisely where the outermost portion of the tire's contact patch will lie. (The Set Up Wheels have been machined so that the flat face and the O-ring tire are in the same plane as the outside edge of standard-offset touring-car rims.)

With the Set Up Board, Take Off offers a simple, functional system to help you get your car dialed. The combo's only flaws are its weight and size; the Set Up Board is a clunky piece of gear to carry around. For now, the board gets me dialed-in the night before a race but stays home on Sunday.

—Peter Vieira



Likes

- Enhances the accuracy of camber, toe and ride-height measurements.

Dislikes

- Inconvenient to carry to races.

*Addresses are listed alphabetically in the Index of Manufacturers on page 225.

PHOTOS BY WALTER SIDAS

ADVERTISER INDEX

AAA Hobby Dist., 126
Ace Hardware Hobbies,
207-209
Acer Racing, 211
Airtronics, 37
America's Hobby Ctr.,
172-173
Associated Electrics, 35,
63, 83, 103, 117, 141
B&T Racing Team, 195
Banzai Motorsports, 188
Bolin R/C Cars, 198
Bruckner Hobbies,
125, 183
BSR Enterprises, 114
California R/C Ctr., 218-
223
Cermak Models, 188
Competition Electronics,
127
Cross Co. Ltd., 161
Custom Electric Cars, 206
Deans Connectors, 118
Dillon Racing, 195
DuraTrax, 31
FMA Direct, 134
Futaba Corp. of America,
101
G.H.I., 166
G.T.P. California, 115
Genka Trading Corp., 44-
45
GM Racing, 77, 123
Hammad Ghuman, 59, 61
Hitec/RCD, 25, 87
Hobby Etc., 189
Hobby Products Intl., 28-
29, 51, 78-79
Hobby Shack, 200-205
Hobby Tech, 116
Hobby World, 194
Horizon Hobby Dist., 19
Innoventive Technologies,
93
Integy Inc., 210
Kawada USA, 75
Kyosho, 14-17, 33, 69,
124
Lite Machines, 86
LRP Electronics, 70
Lucas Racing, 89
M.D. Planes, 180-181

M.I.P., 136
Mach 1 Hobbies, 211
Magma Intl., 188
Maxtec Development, 53
Model Electronics, 206
Model Rectifier Corp., 9
Mugen USA Ltd., 49
Niftech Precision Racing
Products, 217
Novak Electronics, 11
OFNA Racing, 38-39, 62,
88, 106-109, 119
Omni Models, 214-216
Ott-Light Technology, 211
Parma Intl., 85
Peak Performance, 217
Penguin R/C, 217
Precision Model Dist., 217
Pro-Line USA, 6-7, C3
R/C Car Action 1999
Buyers' Guide, 135
R/C Car Kings, 182
RC Imports, 178
Ricambi Model Car
Products, 160
Robinson Racing, 40-41
RPM, 167
Savon Hobbies, 184-187
Schumacher, 67
Serpent USA, 158-159
Sheldon's Hobbies, 168-
171
Sky Hobbies, 132
Stormer Hobbies, 174-177
Tamiya, C2, 54-55, 193
TC Pow-R, 192
Team Losi, 43, 113
Team Orion, 47, 95, 195
Tekin Electronics, 48, 143
Tower Hobbies, 148-153
Traxxas Corp., 71
Trinity Products, 3, 4-5,
12-13, 20, 22-23, 145, C4
Ultimate Hobbies, 197
Wizard Batteries, 206
World Class Inc., 224
WRAM Show, 133
Yokomo USA, 26-27
XS Speed, 211

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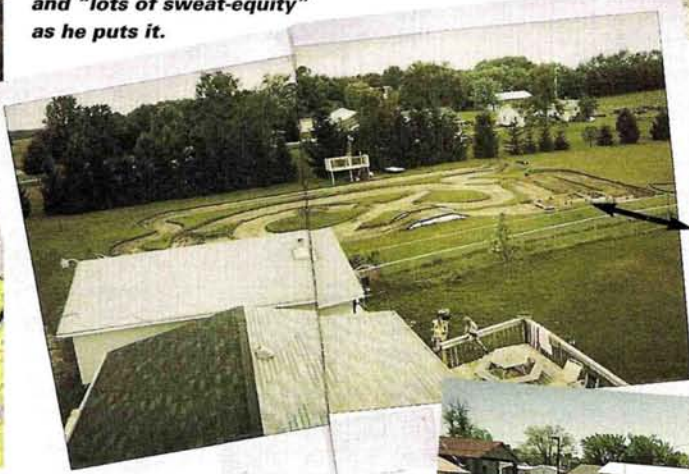
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BY CHRIS CHIANELLI

Makin' Tracks

Here's a bunch of creative guys who took whatever they could find and put it to use in a homebuilt track. Some of the layouts may not be fancy, but when you're neck-and-neck out of a turn with your racing buddies, you'll suddenly be so glad you made the effort. The fun is where you make it.

Below: Tim Kincaid's local track closed, so he built this one in his backyard. It has a 100-foot straightaway, a three-jump "rhythm section" and a banked sweeper. Exploded view is of recently added stair-step framed out with old planks. Tim's building tools were a rototiller, garden tractor w/grader-blade, rake, shovel and "lots of sweat-equity" as he puts it.



Right: using PVC and flex-pipe, David Moyes converted a barren bit of land into a track. Editor's note: dirt should be built-up around the flex-pipe and PVC joints. It's easier on front suspensions!



Above: Matt Marois and his buddy Chris (he has the rototiller) built this simple but fun track in only three hours! That's Matt on the hill that functions as a drivers' stand.

Below: Andy Dember cleared out an area in the woods, raked it and filled it in with extra dirt. He made jumps by covering 6-inch tubing and boards with dirt. Old tires were placed around tree stumps. Very resourceful.



Below: Matt Ramsier writes, "I turned my boring backyard into a racetrack. If I want to drive, I step outside!" Matt's suggestion: "Best track-building time is right after a good rain. The ground is easier to dig." Matt's use of items found anywhere is very creative.



Above: using a rototiller, Michael Carpenter built a track around a tree. Cost was \$0. His motto: "Build tracks, kick butt, have fun!" I agree, Mike.



Above: James Poeling and his racing buddies (Shane and Craig) spent many hours building this track on an empty lot. It's an excellent location for night racing. There's a high-intensity street light next to the track!